The 5th Japan-India Neurosurgical Conference

Harmony between Technology and Philosophy

Dates
October 19-20, 2012

Venue
Osaka International Convention Center
Oral Presentation: Room 1008
Poster Presentation: Room 1004-5
Exhibition: Room 1004-5
The 5th Japan-India Neurosurgical Conference
第五回日本インド脳神経外科会議

PROGRAM & Abstract

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October 19-20, 2012

Venue
Osaka International Convention Center
Oral Presentation: Room 1008
Poster Presentation: Room 1004-5
Exhibition: Room 1004-5

Conference Secretariat: Department of Neurosurgery, Osaka City University
The 5th Japan-India Neurosurgical Conference
Add: 1-4-3 Asahi-machi, Abeno-ku, Osaka 545-8585, JAPAN
Tel: +81-6-6645-3846, Fax: +81-6-6647-8065
E-mail: japan-india@med.osaka-cu.ac.jp
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Dear colleagues:

It is my great pleasure to invite you to join us for the 5th Japan-India Neurosurgical Conference, which will be held at the Osaka International Convention Center on October 19-20, 2012.

This meeting had started in Nagoya in 2003 for the first meeting, and then in New Delhi in 2004, in Tokyo in 2006, and recently in Cochin in 2010. Thus, it has been alternatively held in Japan and India, and it was authorized as the regular friend and scientific meeting by both countries.

The purpose of this meeting is not only to exchange the scientific knowledge, but also to promote mutual friendship between members of both countries. Attendees from India consist of seventeen famous professors and twenty-six young neurosurgeons. All young neurosurgeons will receive a travel grant to cover expenses and half of them will also be invited to participate in a post-conference education program and to have the opportunity to visit selected Japanese neurosurgical centers. One of the fundamental aims of this conference is to contribute to the education of young neurosurgeons who are preparing for important roles as highly qualified medical professionals in India.

I hope that all of you enjoy not only the scientific program but also mutual friendship in this conference.

Sincerely yours,

Kenji Ohata, M.D., Ph.D.

President
The 5th Japan-India Neurosurgical Conference
Organizing Committee

Honorary president: Yoshida J
President: Ohata K
Honorary advisers: Kobayashi S, Hori T, Kawase T, Teramoto A, Hashimoto N
Executive committee: Mehta VS, Sastry KVR, Panikar D, Goel A, Hongo K, Wakabayashi T, Kurisu K
General Information

Dates: October 19 (Fri.) -20 (Sat.), 2012

Venue: Osaka international convention center, Osaka, Japan
5-3-51, Nakanoshima, Kita-ku, Osaka, 530-0005, Japan
Phone +81-6-4803-5555
Oral presentation: Conference room 1008
Poster presentation and Exhibition: Conference room 1004-5

Language: English is the official language of the Conference.

Registration:
On-site registration will start at 13:00 on Thursday, 18th October. On Thursday, the registration desk and conference secretariat is located on the 5 th floor in the convention center and on the other days the desk is on the 10 th floor which is clearly signposted.
On-site registration fee is 15,000 JPY for board neurosurgeons and 5,000 JPY for resident.
Registration will be open during the following hours:
Thursday, 18 th October: 13:00-17:00 (5 F)  Friday, 19 th October: 10:00-18:00  (10 F)
Saturday, 20 th October: 7:30-16:00  (10 F)

Exhibition:
An exhibition is being held in conjunction with the Conference. The Exhibition is located in the Room 1004-5.

Refreshments:
Coffee, tea will be served within the Exhibition Area (Room 1004-5).

Social program:
All participants from India and their accompanying persons are invited to all social programs. The details of the evening functions are scheduled during the conference as below.

Welcome dinner (Participation to the reception of the 71 st Annual Meeting of the JNS)
Thursday, 18 th October: 19:10  RIHGA Royal Hotel Osaka (Royal Hall, Tower Wing 3F)

Presidential dinner
Friday, 19 th October: 19:30  RIHGA Royal Hotel Osaka (Diamond Room, West Wing 2F)

Small excursion and dinner
Saturday, 20 th October: 17:00  Osaka sightseeing cruise and dinner
Guideline for Presenters

Moderators & oral speakers:
Please ensure that you are available in your presentation room at least 10 minutes before the start of the session. It is recommended that all Speakers visit the Speaker Preview Site to confirm audiovisual requirements at least 2 hours prior to the start of the session. The Speaker Preview Site is located on 10th floor which is clearly signposted. Your presentation should be 15 minutes long with a further 5 minutes for questions; please strictly adhere to these times.
Please make sure that all presenters bring your own PC and Macintosh users also bring conversion connector. Mini D-Sub 15 pin connector female is prepared.

Speaker Preview Site: The Speaker Preview Site will be open during the following hours:
Friday, 19th October 11:00 – 17:30         Saturday, 20th October 07:30 – 16:00

Posters:
All posters will be displayed in the Room 1004-5 (Exhibition Area) from Friday, 19th October until Saturday, 20th October. All poster presenters should please ensure that they mount their poster by the correct poster number. Poster presenters should refer to the list of poster presentations included in the final program (which will be distributed on site on arrival in Osaka) for their board numbers. Please ensure that poster presentation should be 4 minutes long with a further 2 minutes for questions. We recommend that you mount your poster on board at least 2 hours before your presentation begins and remove your own posters on the time between 15:00-16:00 on Saturday, 20th October.
The size of the poster board is as below:
Traffic Access

By Train or Bus

- JR Shin-Osaka Station
  - JR Osaka Station
    - JR Tozai Line: 10-minute walk from Exit No.2 or Exit No.3 of Shin-Fukushima Station.
    - Hanshin Umeda Station: approx. 15min.
- JR Shin-Fukushima Station
  - Hanshin Umeda Station: approx. 2min.
- JR Kita-Osaka Station
  - JR Osaka Station: approx. 10min.
- Kansai International Airport
  - Osaka Int'l (Itami) Airport
    - Kansai International Airport
      - Osaka Int'l (Itami) Airport
        - (By taxi) approx. 30min.
- Osaka International Convention Center
  - Osaka International Convention Center
    - By foot approx. 15min.

Nearest stations guide

- Keihan Nakanoshima Line:
  - Next to Exit No.2 of Keihan Nakanoshima (Osaka International Convention Center) Station.

- JR Loop Line: 10-minute walk from Fukushima Station.

- JR Tozai Line: 10-minute walk from Exit No.2 or No.3 of Shin-Fukushima Station.

- Hanshin Railway: 10-minute walk from Exit No.3 of Fukushima Station.

- Subway: 10-minute walk from Exit No.1 of the Central Line or Exit No.9 of the Sennichimae Line of Awaza Station.

By bus from nearby stations

Osaka City Bus

- From the JR Osaka eki-mae bus terminal
  - Get on the Osaka city yellow bus line 53 for "Funabashi" at platform 2 and get off at "Dojima-Ohashi."
  - Get on the Osaka city yellow bus line 55 for "Tsurumachi-Yonchime" at platform 1 and get off at "Dojima-Ohashi."

- Shuttle Bus
  - Guests may use shuttle bus service between RIHGA ROYAL HOTEL (located on the east side of the Convention Center) and the JR Osaka Station west side (under the overhead structure).

- Nakanoshima Loop Bus "Furara"
  - Get on at the "Yodoyabashi" bus stop (Yodoyabashi west end: in front of Sumitomo Building No.1) and get off at the "Osaka Kokusu Kaigijo-mae" bus stop after about 13 minutes.

※Please look for detailed bus stops and schedule descriptions at the "Kitahama Kanko Bus Ltd." website.
Convention Hall

1F

Cloak room
(18-19th October)
Shuttle Bus Stop (18-19th October)

Entrance/exit to RIHGA ROYAL HOTEL

5F

Registration
(18th October)

Cafeteria
Main Foyer

S1 S2

EV(C) EV(R) EV(A)

to 6F from 6F

502 501
<table>
<thead>
<tr>
<th>Time</th>
<th>Day 1 Oct.19 (Friday)</th>
<th>Day 2 Oct.20 (Saturday)</th>
</tr>
</thead>
</table>
| 8:00  |                                                          | 8:00-9:20  
     |                                                          | Session 4: Endoscopic Neurosurgery      |
| 9:00  | *Oral Presentation: Room 1008*                          | 9:20-10:30  
     |     | *Poster Presentation & Exhibition: Room 1004-5*         | Session 5: Spine                        |
| 10:00 |                                                          | 10:30-11:50  
     |                                                          | Session 6: Tumors 2                     |
| 11:00 |                                                          | 12:00-12:30  
     |                                                          | Luncheon Seminar                       |
| 12:00 |                                                          | 12:40-13:10  
     |                                                          | Culture Forum  
     |                                                          | "Technology & Philosophy"               |
| 13:00 | 13:30-13:50 Opening Addresses                           | 13:10-14:50  
     |     | 13:50-14:10 Opening Session                            | Session 7: Tumors 3                     |
| 14:00 | 14:10-15:30  
     |     | Session 1: Tumors 1                                    | 14:50-16:00  
     |     | 15:30-16:50  
     |     | Session 2: Vascular Lesions                            | Session 8: Tumors 4                     |
| 15:00 |                                                          | 16:00-16:10  
     |                                                          | Closing Addresses                      |
| 16:00 | 16:50-18:10  
     |     | Session 3: Functional Neurosurgery                    | 17:00  
     |     |                                                          | Excursion                              |
| 17:00 |                                                          | 18:10-19:10  
     |                                                          | Poster Session (PS): 1-4                |
| 18:00 |                                                          | 19:00        
     |                                                          | 19:30- Presidential Dinner                |
| 19:00 |                                                          | 20:00        
     |                                                          | RhGA Royal Hotel Osaka: West Wing 2F -Diamond Room- |
Scientific Program
# Scientific Program

**Day 1 Afternoon  19 October, 2012 (Friday)**  
**Room 1008**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:30-13:50</td>
<td>Opening addresses</td>
</tr>
<tr>
<td>13:50-14:10</td>
<td>Opening session</td>
</tr>
<tr>
<td></td>
<td>Moderator: A. Teramoto (Tokyo)</td>
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<tr>
<td></td>
<td>Neurosurgery in India</td>
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<tr>
<td></td>
<td>K.E.Turel, Mumbai</td>
</tr>
<tr>
<td>14:10-15:30</td>
<td><strong>Session 1: Tumors 1</strong></td>
</tr>
<tr>
<td></td>
<td>Moderators: D. Panikar (Cochin), T. Sasaki (Fukuoka)</td>
</tr>
<tr>
<td>O 1-1</td>
<td>Recent innovation in acoustic neurinoma surgery</td>
</tr>
<tr>
<td>O 1-2</td>
<td>Management of vestibular schwannomas</td>
</tr>
<tr>
<td>O 1-3</td>
<td>Surgery for the cerebellopontine angle meningioma: How to</td>
</tr>
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<td>preserve cranial nerves</td>
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<tr>
<td>O 1-4</td>
<td>Changing trends in the operative approaches to petroclival</td>
</tr>
<tr>
<td></td>
<td>meningiomas</td>
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<tr>
<td></td>
<td>E.Kohmura, Kobe</td>
</tr>
<tr>
<td></td>
<td>D.Panikar, Cochin</td>
</tr>
<tr>
<td></td>
<td>K.Hongo, Matsumoto</td>
</tr>
<tr>
<td></td>
<td>S.Nair, Trivandrum</td>
</tr>
<tr>
<td>15:30-16:50</td>
<td><strong>Session 2: Vascular lesions</strong></td>
</tr>
<tr>
<td></td>
<td>Moderators: B.K. Misra (Mumbai), T. Kayama (Yamagata)</td>
</tr>
<tr>
<td>O 2-1</td>
<td>Combined bypass and endovascular surgery for giant or complex</td>
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<td></td>
<td>cerebral aneurysms</td>
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<tr>
<td>O 2-2</td>
<td>Microsurgical strategy in the management of giant intracranial</td>
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<td>aneurysms</td>
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<tr>
<td>O 2-3</td>
<td>Endovascular treatment with advanced techniques for difficult</td>
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<td>aneurysms</td>
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<tr>
<td>O 2-4</td>
<td>Surgery for arteriovenous malformations</td>
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<tr>
<td></td>
<td>S.Nagahiro, Tokushima</td>
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<td></td>
<td>B.K.Misra, Mumbai</td>
</tr>
<tr>
<td></td>
<td>S.Miyachi, Nagoya</td>
</tr>
<tr>
<td></td>
<td>A.Goel, Mumbai</td>
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<tr>
<td>16:50-18:10</td>
<td><strong>Session 3: Functional neurosurgery</strong></td>
</tr>
<tr>
<td></td>
<td>Moderators: A. Balasubramaniam (Mumbai), T. Wakabayashi (Nagoya)</td>
</tr>
<tr>
<td>O 3-1</td>
<td>Impact of advances in imaging and technology on the accuracy</td>
</tr>
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<td></td>
<td>and efficacy of lead placement in STN-DBS for Parkinson's disease</td>
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<tr>
<td></td>
<td>A.Balasubramaniam, Mumbai</td>
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<tr>
<td>O 3-2</td>
<td>Robotics in Neurosurgery</td>
</tr>
<tr>
<td></td>
<td>T.Wakabayashi, Nagoya</td>
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<tr>
<td>O 3-3</td>
<td>Writer's and musician's cramp: A new indication of neurosurgery</td>
</tr>
<tr>
<td></td>
<td>T.Taira, Tokyo</td>
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<tr>
<td>O 3-4</td>
<td>Selective motor fasciculotomy in limb spasticity and dystonia</td>
</tr>
<tr>
<td></td>
<td>A.K.Purohit, Hyderabad</td>
</tr>
</tbody>
</table>

| 18:10-19:10| **Poster presentation: Poster session (PS) 1 - 4**                   |
|            | 39 presentations                                                     |
Scientific Program

Day 2 Morning 20 October, 2012 (Saturday) Room 1008

8:00-9:20

Session 4: Endoscopic neurosurgery
Moderators: N. K. Venkataramana (Bangalore), K. Kurisu (Hiroshima)

O 4-1 Endoscopic endonasal skull base surgery with using four-hand technique
H. Akutsu, Tukuba

O 4-2 Endoscopic and microscopic surgeries for brainstem tumors
K. Saito, Fukushima

O 4-3 Endoscopic endonasal pituitary & skull base surgery
N. Saeki, Chiba

O 4-4 Endoscopic surgery of sellar region lesions
N. K. Venkataramana, Bangalore

9:20-10:30

Session 5: Spine
Moderators: A. Goel (Mumbai), M. Takayasu (Aichi)

O 5-1 Surgical approach for spinal intramedullary tumors: Approach selection and importance of the tumor-cord interface*
T. Takami, Osaka

O 5-2 Intramedullary spinal tumors: Surgical techniques
V. P. Singh, Delhi

O 5-3 Variety of anterior cervical approaches and their selection for cervical spondylotic
M. Takayasu, Aichi

O 5-4 Functional outcome following central corpectomy in patients with cervical spondylotic myelopathy
V. Rajeshkhar, Vellore

10:30-11:50

Session 6: Tumors 2
Moderators: K. E. Turel (Mumbai), K. Hongo (Matsumoto)

O 6-1 Monitoring in neurosurgical operations: Indications and pitfalls
K. Kurisu, Hiroshima

O 6-2 Epigenetic plasticity regulated by polycomb repressive complex-mediated histone H3 lysine 27 trimethylation in human glioblastoma
A. Natsume, Nagoya

O 6-3 Postoperative diabetes insipidus in craniopharyngioma
A. Chacko, Vellore

O 6-4 Surgical strategy of hemangioblastoma of the posterior fossa
H. Nakase, Nara

* 10 min including presentation & discussion
## Scientific Program

### Day 2 Afternoon  20 October, 2012 (Saturday)  Room 1008

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00-12:30</td>
<td>Luncheon seminar sponsored by OTSUKA PHARMACEUTIAL CO., LTD.</td>
</tr>
<tr>
<td>Moderator: K. Ohata (Osaka)</td>
<td>Epileptic seizures in neurosurgical common disease  H.Kishima, Osaka</td>
</tr>
<tr>
<td>12:40-13:10</td>
<td>Culture Forum: Technology and Philosophy</td>
</tr>
<tr>
<td>Moderators: K.E.Turel (Mumbai), K.Ohata (Osaka)</td>
<td>S.Kobayashi (Matsumoto) Technology  A.Goel (Mumbai) Philosophy</td>
</tr>
<tr>
<td>13:10-14:50</td>
<td>Session 7: Tumors 3</td>
</tr>
<tr>
<td>Moderators: S. Behari (Lucknow), A. Suri (Delhi), N. Kawahara (Yokohama)</td>
<td>N.Kawahara, Yokohama</td>
</tr>
<tr>
<td>O 7-1</td>
<td>Lateral skull base surgery: Corridors to infratemporal fossa</td>
</tr>
<tr>
<td>O 7-2</td>
<td>Intradural petrosectomy: A new technique for petroclival meningiomas</td>
</tr>
<tr>
<td>O 7-3</td>
<td>Deciding surgical approach for posterior fossa meningiomas</td>
</tr>
<tr>
<td>O 7-4</td>
<td>Preservation of the venous drainage during skull base surgery</td>
</tr>
<tr>
<td>O 7-5</td>
<td>Posterior cavernous anterior transpetrosal posteromedial rhomboid</td>
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<td>(Dolenc-Kawase rhomboid) approach to posterior cavernous and</td>
</tr>
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<td></td>
<td>petroclival lesions</td>
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<tr>
<td>14:50-16:00</td>
<td>Session 8: Tumors 4</td>
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<tr>
<td>Moderators: S. Nair (Trivandrum), K. Saito (Fukushima)</td>
<td>K.Fujitsu, Yokohama</td>
</tr>
<tr>
<td>O 8-1</td>
<td>Multi-disciplinary treatment of medial sphenoid wing meningiomas</td>
</tr>
<tr>
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<td>based on long-term follow-up results of 71 cases</td>
</tr>
<tr>
<td>O 8-2</td>
<td>Acute arterial subdural haematoma in the elderly: Personal</td>
</tr>
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<td>experience *</td>
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<tr>
<td>O 8-3</td>
<td>Giant medial sphenoidal wing meningiomas: Radiological score</td>
</tr>
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<td></td>
<td>predicts extent of excision</td>
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<tr>
<td>O 8-4</td>
<td>Surgical management of parasellar and paracinoidal region</td>
</tr>
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<td>meningiomas</td>
</tr>
<tr>
<td>16:00-16:10</td>
<td>Closing addresses</td>
</tr>
<tr>
<td>A. Goel (Mumbai)</td>
<td>President-elect of 6th India-Japan Neurosurgical Conference</td>
</tr>
</tbody>
</table>

* 10 min including presentation & discussion
# Scientific Program: Poster Presentation

**Day 1 18:10-19:10  19 October, 2012 (Friday)  Room 1004-5**

### 18:10-19:10

**PS 1**

**Moderators:** S. K. Gupta (Chandigarh), E. Kohmura (Kobe)

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 1 - 1</td>
<td>Spinal extradural arachnoid cysts</td>
<td>R.Chandra, Tirupati</td>
</tr>
<tr>
<td>P 1 - 2</td>
<td>Lateral-positioned surgery for spinal degenerative disease</td>
<td>K.Takahashi, Okayama</td>
</tr>
<tr>
<td>P 1 - 3</td>
<td>Intraspinal meningioma of the first two decades of life: An institutional experience of seven cases</td>
<td>M.Phalak, New Delhi</td>
</tr>
<tr>
<td>P 1 - 4</td>
<td>A case of spinal capillary hemangioma</td>
<td>N.Harada, Tokyo</td>
</tr>
<tr>
<td>P 1 - 5</td>
<td>Microsurgical experience with pure cerebellar cavernomas: A study carried out in an Indian district town</td>
<td>M.Chakraborty, West Bengal</td>
</tr>
<tr>
<td>P 1 - 6</td>
<td>Transition of surgical maneuvers and outcome in the transpetrosal approach for skull base tumors</td>
<td>Y.Soo, Sapporo</td>
</tr>
<tr>
<td>P 1 - 7</td>
<td>Facial nerve preservation in 210 cases of vestibular schwannoma: Anatomical and functional status</td>
<td>G.K.Manoharan, Karnataka</td>
</tr>
<tr>
<td>P 1 - 8</td>
<td>Epidural anterior petrosectomy with subdural visualization of sphenobasal vein via the anterior transpetrosal approach</td>
<td>S.Ichimura, Kanagawa</td>
</tr>
<tr>
<td>P 1 - 9</td>
<td>Surgical management of cavernous sinus hemangiomas: Challenges and pitfalls</td>
<td>D.Srinivas, Bangalore</td>
</tr>
<tr>
<td>P 1 - 10</td>
<td>High pressure spontaneous CSF rhinorrhea due to 3rd ventricle colloid cyst</td>
<td>P.Sodhiya, Indore</td>
</tr>
</tbody>
</table>

### 18:10-19:10

**PS 2**

**Moderators:** A. Chacko (Vellore), N. Saeki (Chiba)

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 2 - 1</td>
<td>Identification of Compressed Pituitary Gland in Pituitary Macro-adenoma by Time Resolved Imaging of Contrast Kinetics (TRICKS)</td>
<td>M.Wanibuchi, Sapporo</td>
</tr>
<tr>
<td>P 2 - 2</td>
<td>Transphenoidal surgery for GH-producing pituitary adenomas: Technical innovations and outcome</td>
<td>K.Amano, Tokyo</td>
</tr>
<tr>
<td>P 2 - 3</td>
<td>Surgery for hypothalamic hamartomas: An institutional experience</td>
<td>J.Sudhir, Trivandrum</td>
</tr>
<tr>
<td>P 2 - 4</td>
<td>Granulomatous hypophysitis : Surgical outcome in 4 cases</td>
<td>N.Biswas, Kolkata</td>
</tr>
<tr>
<td>P 2 - 5</td>
<td>Cranopharyngioma in children: Appraisal of surgical management</td>
<td>J.Singh, Udupi</td>
</tr>
<tr>
<td>P 2 - 6</td>
<td>Pathogenetic consideration in the bleeding and non-bleeding</td>
<td>S.Hataoka, Yokohama</td>
</tr>
<tr>
<td></td>
<td>characteristic of orbital and intracerebral cavernous angiomas</td>
<td></td>
</tr>
<tr>
<td>P 2 - 7</td>
<td>Pediatric suprasellar pilocytic astrocytoma variants: Can molecular alterations and proliferative indices predict clinical behavior?</td>
<td>J.L.Gangadharan, Bangalore</td>
</tr>
<tr>
<td>P 2 - 8</td>
<td>Analysis for the recurrence of meningioma using 11C-methionine PET</td>
<td>H.Ikeda, Osaka</td>
</tr>
<tr>
<td>P 2 - 9</td>
<td>Papez circuit and adjoining limbic system: Analysis of anatomy by fiber dissection technique</td>
<td>A.Shah, Mumbai</td>
</tr>
</tbody>
</table>
# Scientific Program: Poster Presentation

**Day 1 18:10-19:10  19 October, 2012 (Friday)  Room 1004-5**

## 18:10-19:10

### PS 3

**Moderators: A.K. Purohit (Hyderabad), H. Nakase (Nara)**

<table>
<thead>
<tr>
<th>P 3-1</th>
<th>Clinical characteristics and predictors of surgical outcome in children and adolescents with temporal lobe epilepsy</th>
<th>R.S. Rajesh, Hyderabad</th>
</tr>
</thead>
<tbody>
<tr>
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Abstract
Recent innovations in acoustic neurinoma surgery

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Objective:
Recent philosophical and technical innovations in acoustic neurinoma surgery are presented.
Patients: 247 patients with unilateral vestibular schwannoma were operated with retrosigmoid approach.

Results:
Many innovations are introduced into acoustic neurinoma surgery. One recent philosophical innovation in acoustic neurinoma surgery is watch & scan policy for small tumor and the other is tendency to leave small piece of tumor on the facial nerve to improve facial preservation. Recognition of tumor-nerve interface layer and paradigm shift from tracing the nerve to removing only the tumor tissue are important. Introduction of ultra-high-field MRI is a great technical innovation in addition to advancement of monitoring. It enabled to predict the location of nerves before surgery. We are using two methods, heavily-T2-weighted image and Diffusion Tensor Imaging (DTI). We verified the predicted location with the surgical finding. The former method provides excellent anatomical resolution but less predictability in large tumor. The latter method can be used for a large tumor but the anatomical resolution is still limited and optimal setting is difficult. Medical treatment with anti-VEGF antibody might be promising in NF2 patients.
Recent innovations are presented through personal experiences.

Conclusion:
Philosophical and technical innovations are going to contribute in further improvement of acoustic neurinoma surgery.
Management of vestibular schwannomas

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Management of vestibular schwannomas has evolved over the years into a multidisciplinary effort with emphasis on preservation of function.

Between June 2002 and October 2011, 202 patients were managed at our institution for vestibular schwannoma. The modalities included surgery, stereotactic radiosurgery and observation where appropriate. LINAC Radiosurgery was used for residual lesions showing growth on serial MRI scans, and when the patient refused surgery. Small tumours and static residual lesions were observed and imaged serially. Facial nerve function was graded by the House Brackman scale, and grouped as good outcomes (HB Gr I-II), intermediate (HB Gr III-IV) and poor (B Gr V-VI).

A total of 178 cases underwent surgery, 109 by the retrosigmoid approach and 69 by the translabyrinthine approach. Good functional facial nerve preservation (Gr I & II) was obtained in over 80% of patients on follow up. There was no significant difference in the long-term functional outcome between the retrosigmoid and translabyrinthine approaches. The facial nerve function was significantly better when electrophysiological nerve monitoring was used. Residual lesions seen on postoperative MRI scans were seen in 47 cases, the majority are stable on annual MRI scans. 8 patients with residual lesions underwent radiosurgery. Primary conservative management with serial imaging was opted for in 4 cases. One patient showed growth of the tumour and underwent surgery. Three other patients are stable for periods ranging from 2-4yrs.

Surgery remains the primary modality for treatment of vestibular schwannomas. Excellent functional facial nerve outcomes can be obtained irrespective of the surgical approach. Residual tumour can be observed and treated with radiosurgery if and when growth is documented. For the remainder, and for some small lesions, observation remains an important modality.
Surgery for the cerebellopontine angle meningioma: How to preserve cranial nerves

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At surgery for the cerebellopontine angle meningioma, brainstem injury should be avoided. Preservation of cranial nerves is also important for patients’ quality of life. There are various points to preserve cranial nerve function during surgery as follows: 1) trying to manipulate the tumor without touching/retracting the cranial nerves, 2) debulking the tumor not to push the nerves, 3) maintaining bloodless and clear operative field, 4) use of cranial nerve mapping/monitoring by way of an electrophysiological method. With careful and gentle manipulation, hearing function can also be restored in a hearing impaired patient. We present our surgical tactics by showing representative cases of cerebellopontine angle meningiomas.
Changing trends in the operative approaches to petroclival meningiomas

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Objectives: A retrospective analysis of 122 cases of petroclival-premeatal meningiomas surgically managed in their institute from 1st Jan 1990 till 10th May 2012 was carried out to see the outcome with various approaches.

Material & Methods: While the tumor resection was carried through an anterolateral/lateral route in 32(27%), it was through a combined posterior subtemporal/pre or trans-sigmoid (posterior petrosal) in 24(20%) & retrosigmoid supra-paracerebellar route in 57 cases (46%). In three cases with extra cranial extension to infratemporal area, a modified Fisch approach was used. Six patients who were in poor clinical condition had only a CSF diversionary procedure. The tumor could be radically removed in 80 patients (66%), subtotally in 27 (22%) and decompression only in 9. Seven patients had tumor excision in two stages. There was an operative mortality of 8.2% (10 cases).

Results: Thirty nine of the 52 patients who underwent surgical decompression since Jan 2004 were operated by the retrosigmoid route and operative mortality for this group of 52 patients have been 4%(2 cases). There was only one operative mortality among the last 39 cases operated by the retrosigmoid route. Out of the 85 patients on long term follow up 58 are independent. Seven out of the nine patients who had symptomatic recurrence were re-operated.

Discussion: The percentage of these tumors operated by conventional retrosigmoid route has increased in the later part of the series thus proving that in many of these tumors without significant middle fossa extension, it is not necessary to use complex and time consuming skull base approaches which in themselves can cause morbidity.

Conclusions: Many of the premeatal-petroclival meningiomas without significant middle fossa extension can be removed by conventional retrosigmoid route with reduced morbidity and mortality.
Combined bypass and endovascular surgery for giant or complex cerebral aneurysms

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The treatment of large or giant complex aneurysm is a challenge because of the limitations and difficulty of direct clipping and endovascular coiling. Regarding large or giant complex aneurysm of the internal carotid artery (ICA), high flow bypass using radial artery or saphenous vein graft between the cervical carotid artery and the middle cerebral artery (M2) followed by abrupt ligation of the cervical ICA have been used to prevent ischemic complications. However, there have been several case reports describing fatal subarachnoid hemorrhage caused by blood flow entry in the aneurysm via the high flow bypass. Surgical trapping of the aneurysm may be ideal for complete isolation of the aneurysm from the blood flow. However, direct surgical trapping is not always possible, depending on the size and the location of the aneurysm. We report a new technique of combined radial artery graft bypass and endovascular parent artery occlusion just proximal to the ICA aneurysm to avoid any blood flow entry into the aneurysm by occluding the ICA branches proximal to the aneurysm.

Five patients presenting with cranial nerve sings due to large or giant aneurysms arising from the C2-C3 or the cavernous ICA underwent high-flow bypass with a radial artery graft and intraoperative parent artery occlusion with coils in the ICA just proximal to the aneurysm. Clinical and radiological follow-up results showed functionally good outcome associated with disappearance or marked shrinkage of the aneurysms and patent high-flow bypass in all cases. The techniques and the postoperative course in these patients will be discussed.
Microsurgical strategy in the management of giant intracranial aneurysms

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Introduction: Giant intracranial aneurysms (GIA) are treacherous lesions with significant risks in management. In spite of the great advances in endovascular therapy the results of EVT in giant aneurysms has been suboptimal. A retrospective analysis of our strategy and results with microsurgery of GIA in the 21st century is presented.

Material and methods: The author has operated on 113 GIA microsurgically till January 2012, 89 since 2000 and the material of this presentation. Age ranged from 2 to 73 years and the female to male ratio was 2:1. 80% were in the anterior circulation and 20% in the posterior circulation.

Results: Exclusion of the aneurysm from the circulation by direct repair (clipping, aneurysmorrhaphy, excision & suture) was done in 57. Flow diversion and ECIC bypass was done in 22, high flow bypass in 20 and STMC in 2. Trapping was done in 10. Temporary ECIC protective bypass was done in 3. Hypothermic cardiac arrest was used in 3 cases of giant basilar artery aneurysm with femoro-femoral bypass for direct repair. Dedicated skull base approach and lumbar drainage helped in avoiding brain retraction. Peroperative parent artery/bypass patency was checked by Microvascular Doppler, catheter angiography / ICG dye angiography. Postoperative outcome was good in 72 (81%), poor in 13 (15%) and 4 (4%) patients died.

Conclusion: Judicious surgical strategy and appropriate technology can result in good outcome in more than 80% of cases of GIA. Majority of the GIA can be treated microsurgically, the preferred modality today.
O2-3
Endovascular treatment with advanced techniques for difficult aneurysms

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Purpose:
Development of assisted technique for coiling has contributed to enlarge the indication of endovascular approach particularly for unruptured aneurysms. The available assisted devices are balloon, vessel reconstruction devices (VRD) and complex catheter techniques. We review our case series of unruptured aneurysms treated by assisted methods and discuss how to select one in each situation.

Clinical materials and results:
Totally 1,123 unruptured aneurysms were embolized in our university and affiliated hospitals these 20 years. Of them 609 cases treated recent 5 years were analyzed. As for the size and location 80% of aneurysms were located in the anterior circulation and 82% of them were small ones less than 10mm in diameter. Assist technique were used in 447 aneurysms (73%) including balloon assist in 207, stent-assist in 67, and double catheter in 173 cases. We encountered 11 complications, 3 with balloon assist and 5 with VRD-assist cases. There were 4 patients with major complications resulting in neurological deficits.
While, double catheter technique is useful for the aneurysm with direct branching from the neck and for ones of distal aneurysms with small parent arteries. The benefit of double catheter was also applied to VRD assisted coiling. This special catheterization technique was used in the 29 aneurysms. All aneurysms were successfully and uniformly embolized with good patients outcome.

Conclusion:
Assisted coiling with advanced techniques is unexceptionally valuable to embolize difficult aneurysms safely and effectively. Various assisted techniques should be used in the proper scene, and be exchangeable or combined each other. While, Flow diverter stent will be another breakthrough to treat giant aneurysms at the skull base.
Surgery for arteriovenous malformations

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Surgery for arteriovenous malformations has a definite, proven and time-tested role in the treatment of arteriovenous malformations. The most important precondition for successful surgery is the selection of an appropriate and the right case.

The author will analyze the anatomical and physical characteristics of arteriovenous malformation on the basis of a surgical experience of over 250 cases. The cases of arteriovenous malformation were divided into five grades on the basis of the extent of surgical difficulties that would be encountered during surgery. The grades were ‘easy’, ‘difficult but safe’, ‘very difficult and risky but possible’, ‘not safe or possible due to the type of arteriovenous malformation’ and ‘difficult or risky due to the site of arteriovenous malformation’.

The treatment modalities of arteriovenous malformations were divided into six groups namely ‘no treatment’, ‘surgery’, ‘embolization followed by surgery’, ‘only embolization’ and ‘only radiosurgery’.

The factors that determined the extent of surgical difficulties included ‘site and eloquence of the area’, ‘number of feeding territories’, ‘degree and rate of flow’, ‘presence of flow-related aneurysms’, and the ‘physical nature’ of the arteriovenous malformation that included the localized, diffuse and multiple nidus.

The presentation will assess the role of surgery in the present day treatment of these lesions.
Impact of advances in imaging and technology on the accuracy and efficacy of lead placement in STN-DBS for Parkinson’s disease.

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Introduction: STN-DBS for Parkinsons Disease is accepted standard for care now. The procedure requires multiple steps and is time consuming.

Material and Methods: All PD patients (24) undergoing STN - DBS were studied for the last 2 years with respect to the time taken for the procedure, the various techniques used in each step and the accuracy of the electrode placement. All had MER done with macrostimulation. 3T MRI was used for the planning with Medtronic framelink software. The hardware used was supplied by initially Medtronic and later on by St Jude’s.

Results: 3T MRI has made visualisation of the STN simpler. The T2 weighted and IR images were used initially used. Later 3D Space sequence was used. With the later coordinates more than 60% of the time we could get 3 track recording. The use of multi 5 channel direct recording with finer cables of Inomed has reduced the MER time by half and the macrostimulation could be achieved in faster time (avg 4 hours, range 3hrs to 6 hrs) for bilateral STN. The use of 3 mm tip St Jude’s implant has reduced the requirement of current (avg 2.2, Range 1.2 to 3.0) though in some it had to be abandoned for proximal electrode due to radiating current induced side effect.

Conclusions: Overall use of 3T MRI with better sequences, fusion software, improvised MER equipment has reduced the time taken and increased the accuracy of implants in STN DBS for parkinsons disease.
Recently major interests of brain tumor group lie in robotics for malignant brain tumor surgery. Besides advanced neurotechnology, as a skillful neurosurgeon, we are also interested in the image-assisted surgical treatment, which is in collaboration with Department of Engineering. Recently, we utilize an intraoperative MR imaging (iMRI) operating unit. The iMRI unit is connected to a network which enables us to share not only real time usual operative images and planning, but also advanced 3D imaging and dynamic fusion images. In addition, high quality neuro-navigation system named “Neuro-mate” was introduced in our operating theater which may improve the accuracy of targeting point to be. “Brain Theater”, the integrated system of intraoperative MRI and neuronavigation, was set up at Nagoya University Hospital in January 2006. The system is featured by the new technology which allows providing operation assistance information gathered through intraoperative MRI and network to not only an operation theater but also other universities and hospitals. As a core function, MRI unit made by Hitachi is situated at No.5 operation theater at Nagoya University Hospital. Also, intraoperative neuronavigation system functions in perfect unison with the operative microscope and peripheral equipment. Furthermore, the secure and high-performance operation theater encourages neurosurgeons to exercise of their traditional surgical technique fully. Additionally, by putting this on the network, it makes possible to share the surgical assist system for: surgery planning, sharing intraoperative image, supporting telesurgery, and developing new therapy outside the operating theater. Thanks to the technical assistance of Department of Media Science, Nagoya University and Department of Radiological Technology, Nagoya University School of Health Science, the system can help education and training activities for students and young neurosurgeon in terms of surgical simulation before an operation. Besides, simulated experience of operation produced by sharing virtual image is useful to decide strategy for clinical cases. Moreover, progress in computer technology makes it possible to utilize the advanced 3D virtual image so that more advanced image analysis is permitted. Particularly, Department of Engineering, Nagoya University designed the fastest software for image analysis and collaboration research is expected to deliver strong result. To achieve minimally invasive and accurate neurosurgical operation, it requires developing a more sophisticated diagnosis device and operation assist device. Present advancement in prevention medicine enhances the opportunities for early detection by medical checkup of the brain and rapid cure for the neurosurgical disorder. Now it is at a major turning point for neurosurgical diseases which can cause serious disability because safe and secure treatment has established as prevention in recent years. There is a pressing need to create a support system by promoting expertise and innovations to meet the increasing demand for neurosurgical treatments.
O3-3
Writer’s and musician’s cramp: A new indication of neurosurgery

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Writer’s cramp is a common disorder among people exposed to excessive writing. Fingers and/or wrist become too stiff and rigid to write only when trying to write. Other movements like using chopsticks are completely normal. It has been argued for many years whether this disorder is a neurological origin or psychogenic. However, it is now well established that writer’s cramp is a form of task-specific focal dystonia. Musician’s cramp is more common in terms of incidence among professional instrument musicians, and is seen 5-8% of them. Half of professional musical players suffering this disorder are not able to pursue their professional life. Conservative treatment such as biofeedback, rehabilitation, and oral medication does not help. BOTOX injections to the abnormally contracting muscles may be indicated, but satisfaction of the patients is not very high.

I have treated 120 patients with such kind of focal hand dystonias by stereotactic thalamotomy of the ventro-oral nucleus. The longest follow-up is 11 years and the surgical effect is persisting. About 10% of patients showed recurrence of the symptoms within 6 months after thalamotomy and half of them underwent second operation. There were no permanent complications. Modern MRI guided thalamotomy with computerized planning is a safe procedure that can be performed within an hour.

I will review our experience of patients’ selection, operative procedure, and pre- and post-operative status of writing and/or musical performance. I believe writer’s and musician’s cramp is a new indication of neurosurgery in terms of treatment, and Vo thalamotomy can bring cure of this difficult disorder.
O3-4
Selective motor fasciculotomy in limb spasticity and dystonia

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Objective: To assess the outcome of selective motor fasciculotomy (SMF) in relieving harmful resistant nonprogressive limb focal spasticity and dystonia in persons with cerebral palsy and other nonprogressive disorders who are undergoing rehabilitative therapeutic exercise programme.

Materials and Methods: Since 1993 more than 3000 SMFs on various peripheral nerves (musculocutaneous, median, ulnar, obturator, sciatic, tibial and a few times axillary, thoracodorsal, suprascapular and femoral) were performed in people having non progressive disorder mainly the cerebral palsy. The age ranged from 4 to 35 in both the genders with a follow up ranging from 2 to 15 years.

Five different scientific research studies of significant number case size affecting various muscles in the limbs were performed using Modified Ashworth Scale, Modified Fahn Marsden Scale, Tardieu Scale, Selective Voluntary Control (SVC) Grade, Gross Motor Function Measure, Wee FIM Scale and Hand Function Evaluation Scorings.

SMF Procedure: The fascicles of the respective nerve branches entering into the involved muscles were dissected, stimulated (bipolar) and hyper active (50+/- 15%) were ablated.

Results: There was significant reduction in impairments and improvement or gain in motor functions (self care and gait) depending on the preoperative SVC. There was no recurrence in impairments and no significant complications were noticed following the surgery.

Conclusions: The SMF significantly reduces targeted impairments and thereby improves fine and gross motor functions in selected people with cerebral palsy and other nonprogressive disorders who have harmful resistant spasticity or dystonia with good SVC. The impairments do not recur and the procedure is safe.
Endoscopic endonasal skull base surgery with using four-hand technique

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Objective: We analyze clinical outcome of patients who underwent endoscopic endonasal skull base surgery (expanded transphenoidal surgery).

Material and Methods: Since November 2009, 103 patients have been underwent endoscopic endonasal surgery in our institute. In this time periods, twenty four patients (7 pituitary adenoma, 4 chordoma, 4 meningioma, 4 craniopharyngioma, 1 suprasellar rathke’s cleft cyst, 1 orbital tumor, 2 ethmoidal carcinoma, 1 fungal granuloma) have been underwent endoscopic endonasal skull base surgery. Patients with 2 ethmoidal carcinoma and 1 fungal granuloma underwent combined transnasal and transcranial surgery. We use binostil approach with using bimanual four-hand technique; assistant ENT surgeon holds the endoscope and maintain the visual field.

Results: Total or subtotal removal was achieved in 17 cases. Complications were 2 postoperative CSF leakage (1 re-operation), 1 cerebral infarction (transient symptomatic), 2 new permanent diabetes insipidus, and 1 anosmia. In 8 cases the middle turbinate was partially resected to treat laterally extending lesions.

Conclusion: Endoscopic endonasal skull base surgery using four-hand technique is safe and effective. Interdisciplinary team surgery is recommended to obtain sufficient working space with preserving function of nasal and paranasal sinus.
Objective: Surgeries of brainstem tumors require special strategies due to deep location and functional structures in the brainstem. We present illustrative cases of microscopic and endoscopic surgeries.

Patients: First patient was a 9 year-old boy with the diagnosis of neurofibromatosis type 1. MRI showed enlargement of a pontine tumor. Second patient was a 9 year-old boy with bilateral ptosis. MRI revealed a midbrain tectal tumor and obstructive hydrocephalus.

Results: Pontine tumor in the first patient was approached using a subtemporal dual-endoscopic approach. The tumor was soft and avascular, and was gross totally removed. Pathological diagnosis was pilocytic astrocytoma. Left occipital transtentorial approach was selected for tectal tumor in the second patient. The tumor was relatively hard and vascular, and was partially. Pathological diagnosis was astrocytoma WHO grade 2.

Conclusions: Surgeries of brainstem tumors are still challenging. Soft and avascular tumor can be removed through a limited operative corridor. Endoscopic surgery might be a new and effective method for selected brainstem tumors.
Here we report endoscopic pituitary and skull base surgery of pathology-based various strategies in our institute. In the last 10 years, 750 cases of pituitary and skull base lesions were operated on endonasally under endoscope. Unilateral endonasal approach via sphenoid ostium was simply carried out for pituitary adenoma, Rathke’s cleft cyst and arachnoid cyst. In cases with tuberculum sella meningiomas, craniopharyngiomas and giant pituitary adenomas, which needed intra-arachnoidal procedure, nasal procedures such as middle and superior nasal conchotomy, posterior ethmoidectomy and skull base techniques such as optic canal decompression and removal of planum sphenoidale were additionally carried out to gain the wider operative field. Both nostrils are used in these lesions. Wide opening of sphenoid rostrum, sellar floor and the dura mater are important to gain sufficient exposure of the intradural lesions. Clival chordomas, chondrosarcomas and cavernous and infratemporal neurinomas are also endoscopically manageable. Optic canal decompression was efficient in cases with traumatic optic neuropathy. To carry the safe procedure, navigation and ultrasonic doppler were essential to identify the location of the vital structures such as ICA. Angled endoscope realized more successful removal of tumor under direct visualization extending into cavernous sinus and lower clivus. EOM (electrooculography) monitoring is also useful to avoid cranial nerve injuries during intracavernous manipulation. In cases with CSF leakage during operation (40 case with grade 3 defined by F. Esposito), dural defect was covered by vascularized mucoseptal flap (Hadad) combined with the multilayer closure technique proposed by Castelnuovo. Lumbar drainage system to prevent postoperative CSF rhinorrhea was essentially needless. Angled & rotatable suction tips, single-shaft coagulation tools and slim and longer holding forceps, all of which were newly designed for endoscopic surgery, were essential for smoother procedure. Endonasal endoscopic pituitary surgery has realized less invasive transsphenoidal surgery. The endoscopic pituitary surgery will be more common and become a standard procedure. The endoscopic skull base surgery has enabled more aggressive removal of skull base tumors with the aid of nasal and skull base techniques. This endoscopic skull base surgery is more highly specialized, needs special techniques with intraoperative monitoring and surgical training. This needs collaboration with ENT doctors & vascular teams in order to pertinently prevent & manage complications. This complex procedure should be carried out only in high volume center-hospitals.
Endoscopic surgery of sellar region lesions

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Objective: The improvement in the optics of endoscopy and instrumentation has improved the accessibility, visibility of the transsphenoidal surgery. This has introduced a new era of minimally invasive surgery replacing the conventional methods. With experience the techniques have been extended to deal the peri sellar pathologies. We would like to share our experience of the Endo nasal transphenoidal approach to pituitary lesions as well as the extended approaches with skull base pathology.

Methods: A total of 84 Neuroendoscopic procedures were performed in the last 4 years. All were jointly performed by the ENT surgeon and a Neurosurgeon. Among these pituitary tumors were 55 confining to sella. Where ever we need to extend the corridors to access the peri sellar lesions are labeled as “Expanded approach”. This in addition will have a vascularized pedicled flap to facilitate closure and repair of the skull base defects. All the expanded approaches were done under the guidance of Medtronic neuronavigation.

The expanded approach was used in giant pituitary Macroadenomas(3), Craniopharyngiomas(3); Esthesioneuroblastomas(1); CSF Rhinorrhoea sinus(13), suprasellar Rathke’s pouch cysts(1),Clival Chordomas(3), Cavernous hemangioma(1), suprasellar menigiomas(1) and suprasellar arachnoid cyst(1), Foramen Magnum meningiomas (1) and Cavernoma of the optic chiasm (1) We focus on the surgical indications, approaches and results, complications, and limitations.

Results: Gross total tumor removal, as assessed by postoperative magnetic resonance imaging, was possible in the majority. Wherever the tumor is adherent to vascular structures, decompression was done within the safety limits leaving a small residue in few.

Complications: There was no operative mortality. One patient had temporary quadriparesis and other had major CSF leak requiring second stage repair. One patient had post operative meningitis recovered well. Proper selection of patients, a detailed anatomical imaging and vascular imaging and understanding of the variations can reduce the complications.

Conclusion: The expanded endoscopic endonasal approach is a promising minimally invasive alternative to open transcranial approaches for selective lesions of the midline anterior cranial base. The avoidance of craniotomy and brain retraction and reduced neurovascular manipulation with less morbidity are potential advantages. Major complications have been few, but there are also limitations with this technique. This Multi-disciplinary approach should be included in the armamentarium of cranial base surgeons and considered as an option in the management of selected patients with these complex pathologies. Good surgical training, anatomical orientation and proper pre operative planning and selection can avoid major complications.
In the surgical approach for spinal intramedullary tumors, posterior median sulcus approach is preferably used for most glial tumors such as ependymomas or astrocytomas, whereas lateral myelotomy from the point at which the lesion can be recognized under the microscope may be suitable for most vascular tumors such as hemangioblastomas or cavernous malformations. Here, we demonstrate our basic concept and technique in the surgery of spinal intramedullary tumors to achieve the precise resection of the tumor with functional preservation early after surgery.

Surgical approach of posterior median sulcus, posterior lateral sulcus, lateral transpial or anterior transpial approach was determined based on MR images before surgery. When conventional MR images such as T1 or T2 weighted images failed to determine the location of the tumor in the axial plane, precise location of the tumor was assessed using contrast-enhanced constructive interference in steady-state (CISS) magnetic resonance imaging (MRI) or myelographic MR imaging using true fast imaging with steady-state precession (TrueFISP) sequences. In the posterior approach, the lateral oblique (45 degrees) position was preferably applied. Transcranial motor evoked potentials (MEP) was routinely set up as the intraoperative neurophysiological monitoring.

Meticulous nonbleeding exposure and dissection of the tumor appeared to be essential for the successful surgery. Glial reactions or hemosiderin deposited tissue encircling the tumor, what is called as the tumor-cord interface, may guide the extent of the tumor resection. Surgeons should try to see the tumor-cord interface which may/must exist in any case of intramedullary tumor. Surgeons should be also aware of the disadvantages related to the approach itself as well as the surgical indications and advantages.
Intramedullary spinal tumors: Surgical techniques

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Spinal intramedullary tumors have been associated with high morbidity. Advances in diagnosis, surgical techniques and adjuncts, and intraoperative monitoring have all contributed to make this surgery safe. The aims of surgery are complete tumor removal with preservation and improvement of neurological function. Good surgical techniques are essential for a good clinical outcome. Proper exposure of the tumor through a clean myelotomy should be done. Rapid debulking of the tumor using an ultrasonic aspirator helps in better delineation of the tumor cord interphase. Identification and coagulation of the small feeding vessels should be meticulously done. The terminal ends of the tumor need special handling to avoid damage. A glistening surface on the inner aspect of the cord is indicative of a good removal. Patients should be operated early for best functional outcomes.
Variety of anterior cervical approaches and their selection for cervical spondylosis

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The anterior cervical approaches are generally used for decompression of the anterior pathology to the spinal cord. Because of less invasiveness to the cervical muscles, postoperative wound pain and axial pain are less as compared with those in the posterior cervical approaches. There are a variety of anterior approaches for the patients with cervical spondylosis, which include the standard anterior cervical decompression and fixation method via the intebody space, Williams-Ishu method, corpectomy method, partial corpectomy method, key-hole foraminotomy without fixation, and so on. Each method has advantages and disadvantages. The best method is selected based on efficacy and less invasiveness for each patient in our practice. In this paper, the essential of each surgical method and selection criteria are reported.
O5-4
Functional outcome following central corpectomy in patients with cervical spondylotic myelopathy

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Objective:
To document the functional outcome following central corpectomy (CC) in patients with cervical spondylotic myelopathy (CSM) using different outcome scales and tools.

Methods:
Approximately 450 patients with CSM underwent uninstrumented CC over a period of 13 years. In different subsets of this group of patients, functional outcomes and their predictors were determined prospectively or retrospectively (in independent studies) using Nurick’s grade, SF 36, WHO QOL Bref, patient perceived outcome score (PPOS), gait analysis, sympathetic skin response (SSR) and visual analogue scale (VAS).

Results:
At a mean follow up of about 3 years, nearly 80% of patients improved following CC including those who were in the poor functional grades preoperatively (Nurick grades 4 and 5). There was an objective improvement in the spasticity as demonstrated by gait analysis. There was good correlation between PPOS and the Nurick grade in determining the outcome after surgery. SF 36 and WHO QOL bref were comparable in their assessment of outcome. Patients had significant improvement in their VAS scores of neck, arm and axial pain after surgery. Finally, SSR showed recovery of sympathetic dysfunction after CC in nearly 60% of patients.

Conclusions:
CC for CSM is an effective surgery that provides good outcomes in nearly 80% of patients. Multimodality assessment of functional outcome is necessary in these patients as a single outcome grading system might not capture all the benefits of surgery.
O6-1
Monitoring in neurosurgical operations: Indications and pitfalls

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Today, intraoperative neurophysiological monitoring (NIOM) has been almost standard in neurosurgery. NIOM has grown into a method used to prevent neurologic injury during surgery. NIOM can warn the surgeon of changes in time to correct problems and prevent postoperative neurologic injury. Two kinds of NIOM are used in neurosurgery. Monitoring aims to identify any signs of neurologic injury and raise an alarm. Testing aims to identify neurologic structures. In our institute NIOM was applied to surgery for posterior fossa and spinal lesion initially. Recently NIOM is applying to almost all neurosurgical cases. In cases of craniotomies motor evoked potential (MEP), somatosensory evoked potential (SEP) and direct cortical stimulation are often applied. Posterior fossa cases may use cranial nerve monitoring, MEP, SEP and brainstem auditory evoked potential (BAEP). Spinal surgery often uses MEP, SEP and free running electromyogram (EMG) monitoring. In this presentation we introduce an overview of NIOM in our institute. Primary goals of NIOM are prevention and documentation of intraoperatively-induced neurologic injury and allow for more complete procedures. We hope that this presentation will stimulate interest in NIOM and consequently decrease the number of patients experiencing intraoperatively induced injury to the nervous system.
Tumor cell plasticity contributes to functional and morphological heterogeneity. To uncover the underlying mechanisms of this plasticity, we examined glioma stem-like cell (GSC) and found that biological interconversion between GSCs and differentiated non-GSCs is functionally plastic and accompanied by gain or loss of polycomb repressive complex 2 (PRC2)-mediated histone H3 lysine 27 trimethylation on pluripotency or development associated genes (e.g. Nanog, Wnt1, BMP5) together with alterations in the subcellular localization of EZH2, a catalytic component of PRC2. The subcellular localization of EZH2 has been shown to be associated with tumor cell differentiation in glioblastoma specimens. Inhibition of EZH2 disrupted the morphological interconversion and impaired GSC integration into the brain tissue, resulting in improved survival of GSC-bearing mice. Our data suggest that epigenetic regulation by PRC2 is a key mediator of tumor cell plasticity and tumor heterogeneity, and that targeting this plasticity may provide a new strategy in glioblastoma treatment.
To determine the incidence, predictors and outcome of diabetes insipidus following surgery for craniopharyngioma (CP) we retrospectively analyzed data in 93 patients who underwent 102 tumour surgeries for craniopharyngioma. The diagnosis of postoperative DI was based on urine output more than 4ml/kg/hr or serum sodium >145 mEq/L and the requirement for pitressin or desmopressin for controlling urine output. The clinical, biochemical, radiological and operative data for these cases was analyzed to ascertain the predictors of preoperative and postoperative DI.

Results: The majority of patients were male and middle-aged. Radical excision was achieved in 56 (55%) of the cases and a majority of these tumours were adamantinomatous CP. Seventeen (16.6%) cases had DI prior to surgery and postoperative DI occurred following 72 surgeries (70.6%). Twenty six (36.1%) had transient DI and 46 (63.9%) had prolonged DI. Thirty six of the 46 patients with prolonged DI came back for follow-up (mean duration: 13 months) and 2 had resolution of DI. Preoperative diabetes insipidus (p=0.008), radical excision (p=0.000) and new onset hypopituitarism (p=0.001) were statistically significant risk factors for permanent diabetes insipidus.
O6-4
Surgical strategy of hemangioblastoma of the posterior fossa

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Hemangioblastomas are benign highly vascular tumors which most frequently occur in the cerebellum. Total resection is the goal, because tumor remnants are known to hemorrhage postoperatively and to progress in the long term. Preoperative embolization of this tumor has been considered helpful in some cases to facilitate excision in sensitive areas. However, the safety of this procedure is not clearly established. The authors present our surgical strategy and results of the posterior fossa hemangioblastoma.

The series consisted of 25 patients (12 male and 13 female), ranging in age from 14 to 83 years. Locations were cerebellar hemisphere (12 cases), vermis (7), and dorsal brain stem (6). There were 6 cases of von Hippel-Lindau’s disease. All cases were symptomatic, and symptoms and signs included cerebellar sign (in 14 cases), headache (in 3), and dizziness and/or nausea (in 8). Hemorrhagic presentation were seen in 3 cases. Presurgical embolization were performed in 13 cases. Total obliteration could be obtained in all cases. Eight cases developed new neurological deficits or worsening of preexisting ones, but these most deficits tended to be mild and transient. The clinical outcome at the discharge was good recovery in 19 cases, moderate disability in 5, and dead in one. Tumor recurrence was not seen during 6 - 96 months follow-up postoperatively.

Posterior fossa hemangioblastomas merit multimodality intervention when feasible in some cases because of their higher risk of intraoperative bleeding and higher potential for morbidity and mortality.
Objective: Infratemporal fossa is located under the middle cranial fossa and behind the mandible. So direct approach to this region is difficult while preserving function. The author compared the benefits and drawbacks of 3 different approaches to this region.

Patients: The author performed surgery for tumors originating from or extending to the infratemporal fossa in 73 cases using various approaches. Basically, 3 different approaches were used. The anterior approach (n=5) by mandibular swing is used for large tumors extending to the midline. Lateral approach by retroauricular infratemporal fossa approach (n=28) was used for tumors already destroying temporal bone or malignant tumors. The preauricular subtemporal infratemporal fossa approach (n=40) was used for benign tumors or as part of anterolateral craniofacial resection for malignant tumors.

Results and Conclusions: Though mandibular swing and retroauricular infratemporal fossa approaches give wide surgical field: however, this approach should be limited to malignant tumors or those which already destroyed the temporal bone because of invasiveness.

Among these, the preauricular subtemporal infratemporal fossa approach would be the best in terms of functional preservation and invasiveness.
O7-2
Intradural petrosectomy: A new technique for petroclival meningiomas

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**Object/ Background:** Excision of petroclival meningiomas remains a surgical challenge. Extradural anterior petrosectomy is widely used as a skull base approach for these tumours. However this approach has significant procedure related morbidity.

**Material and methods:** We describe here an alternative technique of a tailored intradural petrosectomy for removal of petroclival meningiomas. This technique was used successfully in 5 patients.

**Results:** Gross total excision was achieved in most of the patients without significant morbidity. The petrous drilling was tailored depending upon the extent of tumour.

**Conclusion:** Trans-sylvian intradural anterior petrosectomy is a safe approach for petroclival meningiomas. This approach avoids problems related to subtemporal retraction and rationalizes the degree of bone drilling.
O7-3
Deciding surgical approach for posterior fossa meningiomas

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Aim: The aim of the presentation is to validate a proposed grading system to decide on the surgical approach for posterior fossa meningiomas. Posterior fossa morphology was also studied to define the role in the extent of excision of CP angle tumors.

Materials and methods: A prospective study was conducted at the department of Neurosurgery, KIMS, between January 2006 and June 2012. 80 diagnosed and operated cases of CP angle meningiomas and who had at least 6 months of follow up were included in the study and the extent of excision of the tumors was studied. Various approaches were used based upon our proposed grading system taking the IAC, petrous apex and jugular tubercle of both sides. A regression model to predict the extent of excision was formulated.

Results: 80 patients were operated, out of which 43 were female and 37 were male. Age of the patients ranged from 16 to 77 years (39.61 +/-13.54). There were 31 cases of grade 1, 42 cases of grade 2, 4 cases of grade 3, 2 cases of grade 4 and 1 case of grade 5 tumors. Complete excision was achieved in 66 cases (82.5 %) and subtotal excision in 14 cases (17.5%).

The Morphometry of the posterior fossa was also analyzed. The PM angle was 47.8 +/- 4.14 degrees (38-58), the PA angle was 42.68 +/- 4.47 degrees (34-53), the IP distance was 2.07 +/- 0.13 cm (1.5-2.8), the Sagittal diameter of posterior fossa was 6.22 +/- 0.73 cm (5.1-9.8) and the intersigmoid distance was 9.45 +/- 0.73 cm (7.4-11). Statistical analysis was done using NCSS software. All possible regression analysis was done to select the important variables to be included in the model to predict the excursion of tumor with these variables. Only four variables were found to be useful in the model, namely Grade of Tumor, Sagittal diameter of posterior fossa, PM, Sagittal extension of the tumor.

Conclusion: The proposed grading system along with the PM angle, sagittal diameter of the posterior fossa and the tumor were significant in deciding the extent of excision of the CP angle tumors.
O7-4
Preservation of the venous drainage during the skull base surgery

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Many of the venous complications may occur unexpectedly and might be serious in some cases. It is almost impossible to determine whether we can safely sacrifice a certain vein during the operation, or not. To avoid the venous complications, we should preserve the veins as far as possible. Especially in cases of the epidural approaches to the cavernous sinus, Meckel’s cave, the petroclival region and the infratemporal fossa, we should preserve the drainage route of the middle cerebral vein, which has some variation, such as the sphenopetrosal vein (sinus) and the sphenobasal vein. The drainage route from the cavernous sinus is also important. I will present how to preserve the various venous drainage routes during the epi- and inter dural subtemporal approach and the anterior petrosal approach.
Posterior cavernous anterior transpetrosal posteromedial rhomboid (Dolenc-Kawase rhomboid) approach to posterior cavernous and petroclival lesions

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Anterior transpetrosal approach involves extradural exposure of the postero-medial (Kawase) triangle which is bounded by the Arcuate eminence, the Greater Superficial Petrosal Nerve (GSPN) and the Petrous ridge. It allows exposure of the tentorium and the middle fossa, and the posterior fossa till the internal auditory meatus. Despite permitting a key access, the exposure is conical and crowded; it does not allow proper exposure to the Vth nv. exiting from the tentorium, the VI th nerve in the Dorello canal and the under-surface of the attachment of the tentorium to the posterior clinoid process. Dissection of the posterior cavernous sinus wall over the V2, V3 and Gasserian Ganglion permits access to a Posteromedial Rhomboid bounded by the Arcuate eminence (posterior), GSPN (lateral), the petrous ridge (medial) and V3 and Gasserian Ganglion (anterior). Ligation and division of the superior petrosal sinus close to the posterior clinoid process and gentle elevation of the V nerve root permits enlarged view of the previous inaccessible areas. Posterior cavernous anterior transpetrosal posteromedial rhomboid (Dolenc-Kawase rhomboid) approach with or without zygomatic osteotomy was used in the treatment of petroclival meningiomas (32), giant dumbell trigeminal schwannoma (11), clival chordoma (6), clival chondrosarcoma (4), trochlear schwannoma (1), giant posterior fossa craniophrangioma (4), middle posterior fossa epidermoid (2), hypothalamic hamartoma (1), giant low basilar bifurcation aneurysm (2), petroclival hemangiopericytoma (1) and bilateral petroclival, cavernous and tentorial histiocytosis (Rosai Dorfman).

Conclusions: Posteromedial rhomboid petrous apex approach is technically demanding and requires a thorough knowledge of skull base anatomy and pathology; it provides safe corridor during the microsurgical treatment of a spectrum of skull base lesions.
Multi-disciplinary treatment of medial sphenoid wing meningiomas based on long-term follow-up results of 71 cases

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Present status, limitations, and aggressive multi-disciplinary treatments of medial sphenoid wing meningiomas are discussed based on the long-term follow-up results of 71 cases. Taking into consideration of the anatomical relation between the internal carotid artery (IC) and the main attachment of the tumor, these cases are grouped into anterior, pure clinoidal, wing root, para-cavernous sinus (CS), IC lateral, IC medial, posterior, and combined type. Concept of compartment formation of the tumor is most important and helpful for surgical treatment of medial sphenoid wing meningiomas, but radical resection of the posterior and combined types is often impossible.

Tumor recurrence after supplemental radiosurgery in the spheno-petro-clinoide region is the most difficult situation to treat. An aggressive treatment of these recurrent cases, i.e. “extended trans-sylvian, look-up and look-down approach” for posterior CS and spheno-petro-clival region, is also presented.
O8-2
Acute arterial subdural haematoma in the elderly: Personal experience

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Introduction:
Spontaneous acute subdural haematoma of arterial origin is relatively rare, usually occurring in the elderly with minimal co-morbidities. Radiological findings are typical showing acute haematoma over the entire hemisphere with out any other associated cranial or cerebral injury. Since the original article by Drake in 1961 reporting 11 cases, very few cases were reported and only 38 cases have been reported in the English literature up to 2009.

Discussion:
The author has collected 26 cases between 2005 and 2011. Majority of patients did not have serious co-morbidity or on multiple medications including anticoagulants. It has been observed that there are typical CT scan findings to make an earlier diagnosis and institute emergent surgical procedure which has improved the overall survival although many of them present in a poor neurological state. The age ranged from 48 yrs to 79 years with a mean age of 67 yrs. Controlled hypertension was noted in 10 cases, four had previous cerebro vascular accident and two had previous subdural haematoma. Eight patients were on anticoagulant to control pre existing cardiac condition. Out of 26 cases one died. (3.8%), one with severe disability (3.8%) and the remaining survived and after intensive rehabilitation therapy returned to normal or near normal life. Consequence of missing the diagnosis, conservative management will be discussed.

Conclusion: Personal collection of 26 cases of acute subdural haematoma of arterial source in the elderly must be carefully evaluated on admission and surgical management is the best option as the outcome and quality of survival are different from acute subdural haematoma due to other causes.
Objective: Surgery for giant medial sphenoid meningiomas (GMSWM; greater than or equal to 5cm in maximum dimension) is challenging due to their intimate relationship with vital neural structures like the optic nerve, cranial nerves of the cavernous sinus and the cavernous internal carotid artery. A preoperative radiological scoring system when applied to these tumors predicts the grade of tumour excision.

Material and Methods: The radiological scoring system (range 1-12) was applied to 20 patients of GMSWM (maximum tumour dimension range: 5.2 to 9.5 cm; mean maximum dimension=6.12±1.06 cm). It considered tumour volume (using Kawamoto’s method); extension into the surrounding surgical corridors; extent of cavernous sinus invasion (based on the tumour relationship to the cavernous internal carotid artery); associated hyperostosis and/or >50% calcification; and, associated brain oedema. Both the conventional frontotemporal craniotomy (n=13) and its extension to orbitozygomatic osteotomy (n=7) were utilized. The cavernous sinus was explored in 4 patients and the hyperostotic sphenoid ridge drilled in 5 patients.

Results: Total excision was achieved in nine patients; small tumour remnants within the cavernous sinus, interpeduncular fossa or suprasellar cistern were left in eight patients; and less than 10% of tumour was left in three patients. When the preoperative radiological score was greater than or equal to 7, there was considerable difficulty in achieving total tumour excision. A mean follow of 17.58 ±15.05 months revealed improvement in visual acuity/field defects in three, stabilisation in 11, and deterioration of ipsilateral visual acuity in five patients. Symptoms of raised pressure, cognitive dysfunction, aphasia and proptosis showed improvement.

Conclusions: Both the standard as well as skull base approaches may be utilized for successful removal of GMSWM. A preoperative radiological score of greater than or equal to 7 predicts a greater degree of difficulty in achieving complete surgical excision.
O8-4
Surgical management of parasellar region meningiomas

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One of the most crucial points of surgery for parasellar meningiomas is how to explore and remove tumor extending into optic canal, superior orbital fissure, inferior orbital fissure, cavernous sinus, orbital cavity and/or paranasal sinuses without neurological deterioration. We experienced 82 cases of parasellar meningiomas, including 29 cases of tuberculum sellae meningiomas, 27 clinoid meningiomas, 15 cases of the other types of sphenoidal ridge meningiomas, and 11 cases with cavernous sinus extension, during last 6 years. In this paper, we retrospectively analyzed these cases with special attentions paid for optimal strategy to prevent visual functional deterioration and external ophthalmplegia.
Epileptic seizures in neurosurgical common disease

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Stroke, brain tumor, and traumatic brain injury are common diseases for neurosurgeons. These diseases are possible causes of epilepsy even after they are well treated. In this lecture, I will discuss the etiology and treatment of epilepsy due to these diseases.
Spinal extradural arachnoid cysts

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Aims: To analyze our experience with spinal extradural arachnoid cysts.
Methods: Fifteen patients underwent surgical treatment for spinal extra dural arachnoid cysts from January 2004 to December 2011. The general strategy was to meticulously dissect the cyst in toto, identify the communication between the cyst and the dural tube followed by complete excision. The clinical, radiological, operative, and pathological findings of the patients were retrospectively analysed.
Results: This series included 10 women and 5 men. The age ranged from 12 to 50 years, with an average age of 31 years. Back pain and progressive paraparesis were the most common chief complaints. There were five cysts in the dorsal region and ten in the dorsolumbar region. All the cysts were located posterior to the dural tube. All the cysts were approached through a posterior midline approach. The site of communication of the cyst and dural tube was identified in eight patients which was ligated in all patients. All cysts were marsupialised or excised. The average followup period was twenty eight months with no recurrences. One patient developed pseudomeningocele and required shunt procedure in the postoperative period.
Conclusion: Spinal extradural arachnoid cysts are rare but benign lesions. The mainstay of treatment in symptomatic patients is complete excision of the cyst, followed by obliteration of the communicating pedicle with the dural tube. This is the largest series (fifteen patients) dealing with spinal extradural arachnoid cysts.
Lateral-positioned surgery for spinal degenerative disease

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Lateral positioning is the important step for minimally invasive spinal surgery as same as brain microsurgery. Prone position could be the one of risk factors for patients with high body mass index and several comorbidity. Lateral position might be thought less invasive than prone position. We report in this paper about positioning and perioperative complications for spinal surgery.

Objective: In our hospital, we experienced 102 cases with cervical spondylotic myelopathy (CSM) and 68 cases with lumbar canal stenosis (LCS) with lateral position from 2003. Operative methods are laminoplasty (K-method) for CSM, transmuscular unilateral bilateral decompression (TUBD) for LCS. A skin incision was usually small in both CSM and LCS. Common important key on positioning is to be lift-up upper leg for prevention of venous congestion. On K-method for CSM the key is that spine axis is straight and neck is fixed with neutral position. To decompress for LCS is able to expose by rotating the operative table for contralateral side. Microsurgical procedure was similar with brain surgery.

Results:
It was less invasive for surgeon’s mind and physical during surgery. No perioperative complications of operated cases have been occurred. Skin eruptions on lower axilla, hip, and lateral chest wall were seen transiently. On Surgery for LCS, visualization for opposite side was enough at lateral position.

Considerations:
We consider that lateral-positioned spine surgery is alternative method and useful if it could not be impossible to be prone position.
Intraspinal meningioma of the first two decades of life: An institutional experience of seven cases

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Introduction: Occurrence of spinal meningioma is rare in children and adolescents. Epidemiologic, prognostic and therapeutic features of spinal meningioma in children are poorly defined. Few small case series and extrapolation of adult data have formed basis of the clinical knowledge so far.

Objectives: This study was done to analyse the clinical features and prognostic variables on child and adolescent intraspinal meningioma based on our institutional experience.

Materials & Methods: In this retrospective study over 7 years (May 2005- April 2012) records of spinal meningioma patients (< 21 years of age) who underwent surgery were analysed. Clinical, radiological and follow up data was reviewed in all cases

Observations: Mean age of presentation was 17.1 yr, with slight female sex predilection (female: male ratio 1.33:1). The most common initial symptoms were back pain and spastic paraparesis 71.4% each, followed by sensory involvement (42.9%) and bladder incontinence (28.6%). Thoracic spine was the most favoured location (5 cases). Features of associated NF-2 were seen in one case. Simpsons Grade 1 (1/7), Grade 2 (5/7) cases and Grade 3(1/7) resections were done. Histopathological analyses revealed Grade I meningioma in all cases, commonest was meningothelial variant. Mean follow up period was 14.1 months, during which period 1 recurrence was detected.

Conclusions: Intraspinal meningiomas in children and adolescents are uncommon indolent tumours. NF-2 and incomplete excision of tumour are associated with unfavourable outcome and may warrant regular follow-up. Further studies in larger cohort of patient are required to delineate prognostic variables.
A case of spinal capillary hemangioma

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Objective: We report a rare case of Capillary hemangioma arising from thoracic spinal cord. The tumor was followed a course is repeated exacerbations and remissions.

Patient: A 70-year-old woman repeated lower limb paraplegia with deep and superficial dysesthesia three times in three years. She recovered completely without any treatment. MRI showed a tumor of 20mm in diameter in contact with the dura mater in the dorsal Th8 vertebral body.

Results: At surgery tumor attached strongly with spinal cord, we supposed it was arised from subpial structure.

Conclusions: Capillary hemangioma occur in spinal cord area is less reported, were reported in 28 cases include the case for ours. And we supposed that the natural history of a soft tumor is likely to repeat exacerbations and remissions.
Objective; The aim of this study was to analyze the efficacy and subsequent patient related outcome of microsurgical excision of cerebellar cavernous malformation (cavernomas) a relatively rare lesion of the posterior fossa. In this paper we thus describe our experience with microsurgical resection of these lesions keeping in view that the study was carried out in a district town in India.

Methods and Materials; 100 patients of intracerebral cavernomas presented at our centre during the span of 2001-2011 of which 10 cases were those of pure cerebellar cavernomas (4 males and 6 females). The presentation was acute or sudden in all cases and the patients had positive cerebellar signs. C.T. Scan and MRI was the investigation of choice. The patients were operated upon by the author himself and all of them underwent a gross total resection via a sub occipital craniotomy. Patients were then subsequently followed up.

Results; Immediate post surgical assessment revealed that two patients had neurological impairment in the form of persistant nystagmus and ataxia respectively. There was no known neurological deficits both on short and long term follow up for the remaining patients. There was no surgery related complication of any sort.

Conclusions; Pure Cerebellar cavernomas are relatively rarer lesions in the posterior fossa and good results have been obtained by en bloc microsurgical resection. Thus meticulous surgery should be considered as the most effective and safe modality for the management of these lesions.
P1-6  
Transition of surgical maneuvers and outcome in the transpetrosal approach for skull base tumors

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Objective:  
We have changed some maneuvers in skull base surgeries for the prevention of complications. Decrease of complication has derived, especially in CSF leakage. We report our improved point and outcome.

Materials and Methods:  
We analyzed 36 operations of 34 patients who underwent posterior transpetrosal surgery from 2000 through 2011. Thirty-six cases were divided in two groups; 20 from 2000 to 2005 as A group, 16 from 2006 to 2011 as B group. Mean age was 52 and 53, male vs. female was 8:12 and 6:10, respectively. A group consisted of 12 meningiomas, 3 schwannomas, 3 epidermoids, and 2 others. B group consisted of 9 meningiomas, 3 hemangiopericytomas, 3 schwannomas, and 1 epidermoid. Main modification was dural incision without obstructing venous flow using vascularized flap, suction irrigation, and non-stick bipolar forceps.

Results:  
In A group, gross total removal (GTR) was made in 10, subtotal removal (STR) in 8, partial removal (PR) in 2. In B group, GTR was in 3, STR in 8, PR in 5. Pre- and post-operative mean Karnofsky Performance Status (KPS) deteriorated from 78 to 72 in A group, and improved from 81 to 84 in B group. Cerebrospinal fluid (CSF) leakage occurred in 4 of 20 only in A group. Mean duration of postoperative lumbar drainage was 6 days in A group, and 4 days in B group.

Conclusions:  
Improvement of KPS and CSF leakage has brought by changes of surgical maneuvers. Long continuous lumbar drainage does not seem to relate to prevention of CSF leakage.
Facial nerve preservation in 210 cases of vestibular schwannoma: Anatomical and functional status

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Introduction: Surgery for vestibular schwannoma taxes the surgeon’s skill to the hilt especially in removing the tumor completely and preserving the facial nerve.

Aims: To study the anatomical and functional status of the facial nerve in patients after vestibular schwannoma surgery and analyze the factors contributing to the outcome after surgery.

Materials and methods: A retrospective analysis of all the case records of patients operated for Vestibular Schwannoma in our hospital was done which included their pre operative facial nerve function and post operative anatomical and functional status. The data was analyzed and conclusions drawn.

Results: 210 patients who underwent surgery for vestibular schwannoma were included. In 111 patients (53%) preoperative facial nerve deficit was present and graded by House and Brackman grading. 207 out of 210 patients were operated by suboccipital retromastoid route. In 138 patients anatomical preservation of facial nerve was done, of which 120 patients underwent internal auditory meatus drilling. The rate of anatomical preservation has increased from 10% in the initial part of the study period to 100% in the latter part. Overall, 82.8% of the patients had a good functional outcome and 17.2% had a worse functional state than their preoperative status. We had operative mortality of 2.5%.

Conclusions: Ability to preserve the facial nerve improves with number of cases. Transmeatal drilling helped in identifying and protecting the facial nerve. Majority of patients in our series have presented as large tumors (69%) inspite of which good functional outcome was achieved.
Epidural anterior petrosectomy with subdural visualization of sphenobasal vein via the anterior transpetrosal approach

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The drainage of the superficial middle cerebral vein (SMCV) is classified into 4 subtypes. The sphenobasal vein (SBV) is drains from the SMCV to the pterygoid venous plexus at the temporal skull base. Epidural procedures in the standard anterior transpetrosal approach (ATPA) may damage the route of the SBV. We report a case in which modified surgical procedures via the ATPA were used to preserve the SBV. A 45-year-old man complained of right facial pain. Magnetic resonance (MR) images revealed a right cerebellopontine tumor suggestive of an epidermoid cyst. Right carotid angiography revealed that the SMCV drained into the pterygoid venous plexus via the SBV. The convexity dura mater of the temporal lobe was cut and the anterior part of the temporal lobe was retracted subdurally. The basal dura of the temporal lobe posterior to the SBV vein was visualized and cut subdurally. The posterior part of the temporal lobe was retracted epidurally. After dissecting the dura mater medial to the greater petrosal nerve and to the edge of the petrous apex, the petrous apex was exposed and drilled out without injuring the SBV. The superior petrous sinus and the tentorium were cut. The tumor was compressed the root exit zone of the trigeminal nerve. The tumor was grossly totally removed. The modified ATPA (epidural anterior petrosectomy with subdural visualization of sphenobasal vein) is effective to preserve the SBV.
Surgical management of cavernous sinus hemangiomas: Challenges and pitfalls

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Introduction: They are very rare and account for 2% of all cavernous sinus tumors. They are benign well encapsulated lesions and arise within the confines of cavernous sinus and usually reach giant size before diagnosis. As the tumors grow in size, they initially displace and later encase the ICA. They present a formidable surgical challenge due to their location, high vascularity, and close relationship with important neurovascular structures. In this presentation we present our experience (including video) with the surgical management of these tumors.

Material and methods: In this retrospective study we analysed all patients of cavernous sinus hemangiomas who underwent surgery at NIMHANS from 2007-2011 (5 years). A detailed study of their demographic characteristics, clinicoradiological features, surgical management strategies and details, outcome and long-term follow-up was performed.

Results: There were a total of 7 patients (5 females and 2 males) who underwent surgery for these tumors. The ages ranged from 21 to 50 years with duration of symptoms ranging from 2 months to 5 yrs. Restriction of ocular movements along with headache and facial hypoesthesia were the most common symptoms. All patients underwent frontotemporo oribtozygomatic (FTOZ) osteotomy, and gross total excision of the tumor. There was no mortality while worsening of ophthalmoparesis was the most common complication. Vision improved in 2 patients out of 3 patients with preoperative vision loss.

Conclusions: Surgery in these tumors and region can be carried out safely in this region by surgeons with experience in skull base surgery.
A 25 year young male presented with a history of episodes of headache, visual blackouts and blurred vision for 6 months. There were episodes of watery discharge through left nostril with relief of headache. History of trauma was ruled out. A CT scan suspected a colloid cyst of 3rd ventricle and referred to higher center for surgery. He lost to follow up and presented 6 months later with symptoms suggestive of meningitis with CSF rhinorrhoea. Nasal Endoscopy confirmed continous high flow CSF coming from opening of the sphenoid sinus on left side. MRI brain confirmed the diagnosis of 3rd ventricle colloid cyst with hydrocephalus. MR Cisternogram showed a CSF tract communicating from left temporal horn of the ventricle to the left sphenoid sinus. Endoscopic excision of the colloid cyst was done uneventfully with relief of all his symptoms and at 2 years of regular f/u there is no recurrence of any CSF rhinorrhoea.

There are only six reported cases of colloid cyst of 3rd ventricle presenting with spontaneous CSF rhinorrhoea. In all cases the site of leak was non-traumatic defect in the cribriform plate or sella region of anterior skull base. In our case the CSF fistulous tract was communicating from the left temporal horn of the ventricle to the sphenoid sinus. The obstructive hydrocephalus due to colloid cyst resulted in high pressure spontaneous CSF rhinorrhoea. This case may give insight regarding the congenital or acquired etiopathogenesis of spontaneous CSF rhinorrhoea.
P2-1
Identification of Compressed Pituitary Gland in Pituitary Macroadenoma by Time Resolved Imaging of Contrast Kinetics (TRICKS)

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In an endoscopic endonasal transsphenoidal surgery (ETSS), anatomical correlation of pituitary adenoma, the internal carotid artery, the optic nerve, and bony structures should be obtained for performing safe surgery. Furthermore, identification of the pituitary gland compressed by the tumor provides helpful information to protect hormonal secretion. Since time resolved imaging of contrast kinetics (TRICKS) is a kind of magnetic resonance (MR) sequence which reveals blood flow, it is applied for hemodynamic analysis. TRICKS is characterized high spatial and temporal resolution. The aim of this study is to identify the pituitary gland focused on the pituitary portal system.

Twelve cases of pituitary macroadenomas were analyzed by TRICKS using three tesla-MR (signa HDX 3T, GE Healthcare, USA).

The pituitary gland was depicted in all cases even though the adenoma was giant or recurrent. The TRICKS technique makes surgeons easy to identify the compressed pituitary gland.
P2-2
Transsphenoidal surgery for GH-producing pituitary adenomas: Technical innovations and outcome

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Background
Transsphenoidal surgery (TSS) is safe and effective in patients with GH-producing pituitary adenomas (GHomas). We report the endocrinological follow-up results of a large cohort of such patients who underwent TSS after the introduction of some technical innovations.

Patient and methods
The study includes one hundred fifty patients with GHomas operated on consecutively by TSS between September 1998 and November 2010. Man : Woman = 55 : 95. Age : 10-73 years (average 47.9). These cases were classified into three periods, early fifty cases (I), intermediate fifty cases (II), and last fifty cases (III). We removed the main bulk and the microsurgical pseudocapsule of the tumour under microscope, and rigid 30 and 70 degrees endoscopes were consecutively introduced to remove residual tumour at the far lateral and superior sides using curved suction with extension tube, angled irrigation suction, and flexible forceps. We have taken care of not to make endocrine dysfunctions such as GH deficiency recently.

Results
The remission rates based on Cortina consensus showed improvement comparing series of I to III, indicating 46%, 62%, and 86% as a whole for series I, II and III respectively, and 56.8%, 76.7%, and 100% in Knosp grade 0-1, and 40%, 53.3%, and 86.7% in Knosp grade 2-3. Severe GH deficiency was found in 5 patients (10%) for series III.

Conclusions
Our data confirms that technical innovations and proficiency in endoscopic manipulation improve the remission rate of GHomas, and it can be improved further using high-definition endoscopic visualization since 2011.
P2-3
Surgery for hypothalamic hamartomas: An institutional experience

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Objective:
A retrospective analysis of patients operated for hypothalamic hamartomas was carried out to study correlation of size, location, radiological subtype with seizure semiology, symptoms, choice of optimum surgical approach.

Methods:
Clinical data of fifteen consecutive patients (10 males, 5 females) with mean age of 12.8 years with histologically proven hypothalamic hamartomas (1995-2011) were analysed.

Results:
Eight patients (53.3%) had intractable seizures (group 1), 5(33.3%) had refractory precocious puberty (PP) (group 2) and 2(13.3%) had both (group 3). Mean maximum dimension of the HH in groups 1, 2 and 3 were 11.3 mm, 9.2 mm and 17.5 respectively, and the median Delalande Fohlen radiological subtype was II in groups 1 and 2. Seizure types included purely single semiology; gelastic (2), CPS (1), both gelastic and CPS (3), both gelastic and generalized tonic-clonic (2) and all three types in one patient. Nineteen surgical procedures were done on 15 patients. Primary procedures were transsylvian approach in 10 patients (66.7%), transcallosal interforniceal in 3 (20%) and endoscopic excision in 2 patients (13.3%). Reoperations were by the transylvian route in two patients and endoscopic in one patient. Complete resection was achieved in 9 patients after the primary procedure (4, 5 and none in groups 1, 2, 3 respectively). At a mean 3.7 years follow up the seizure outcomes in Engel class I, II, III and IV were 4, 5, 0 and 1 patient/s respectively.

Conclusions:
The extent of excision correlated with better symptom relief both for refractory seizures and precocious puberty. More than one surgical approach may be necessary and the optimum approach is decided by the size and radiological subtype of the lesion.
Granulomatous hypophysitis: Surgical outcome in 4 cases

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Objectives: Granulomatous hypophysitis is extremely rare and presents with chronic inflammation of the enlarged pituitary gland. They commonly mimic pituitary adenoma. Our study presents four patients diagnosed with granulomatous hypophysitis.

Methods: All the four patients were diagnosed to be suffering from pituitary macroadenoma. All of them underwent transsphenoidal microsurgery. There was no evidence of systemic tuberculosis in any of them.

Results: The histopathology report came as granulomatous hypophysitis. However differentiation could not be done between tuberculosis and sarcoidosis. All the patients received anti tubercular therapy and all are doing well. There is complete resolution of the granuloma on post operative scans.

Conclusions: Granulomatous hypophysitis should be considered in the differential diagnosis of pituitary adenomas specially in developing countries like India. The condition is potentially curable with anti tubercular therapy.
Cranipharyngioma in Children: Appraisal of surgical management

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Objectives: Cranipharyngiomas are histologically benign, but have a malignant clinical behavior. The objective was to study the outcome of patients after Cranipharyngioma surgery and attempt to formulate management strategies.

Methods: A retrospective analysis of patients operated for Cranipharyngioma who were less than 18 years of age in our department was done. Patients were followed up to determine the recurrence rate and quality of life.

Results: 47 patients of Cranipharyngioma in the pediatric age group were treated in our hospital in the last 15 years. Most pediatric patients presented with features of raised ICP (81.5%). Out of the total 47 patients, near total excision was done in 83.9%, and partial excision in 16.1%. There was an overall mortality of 8.7%. The longest follow up time was 15 years and the shortest was 6 months. Overall recurrence rate was 23%. 23.8% who underwent near total excision and 16.6% who underwent subtotal excision with RT had recurrence.

Conclusions: Total excision should be attempted whenever a smooth microscopic dissection is possible. Whenever there is a risk of inflicting injury to the surrounding vital structures, one should settle for a sub-total or partial excision. Post op radiotherapy is preferred; except for those where total excision is confirmed by CTscan. In predominantly sellar lesions, complete tumor removal via extra cranial route (transsphenoidal approach) is attempted and in case of recurrence, transcranial surgery is performed and then radiotherapy is advised accordingly. The aim of treatment should always be to maintain optimal functional integrity.
P2-6
Pathogenetic consideration in the bleeding and non-bleeding characteristic of orbital and intracerebral Cavernous angiomas

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Intracerebral Cavernous angiomas (CAs), especially those in the brain stem, are sometimes hospitalized by their causative intracerebral hemorrhage. On the contrary, CAs in orbit or those in the pineal cistern are unlikely to bleed. These different features are analyzed from our surgical experience of over 50 CAs, and we discuss this interesting issue from the pathological point of view.
P2-7
Pediatric suprasellar pilocytic astrocytoma variants: Can molecular alterations and proliferative indices predict clinical behavior?

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Introduction: Pilomyxoid astrocytoma (PMA) (WHO Gr.II) and Pilocytic Astrocytoma (PA) with anaplastic features (WHO Gr.III) are the two potentially aggressive variants of pilocytic astrocytoma occurring commonly in the suprasellar region. Though they have classical radiological features, their clinical behaviour can be unpredictable.

Methods: All cases of paediatric suprasellar PA and its variants operated between 2007 and 2011 were reviewed. IHC for proliferative markers like MIB labeling index, p53 mutation and IDH1 mutation were analysed. The outcome in terms of recurrence and progression of the residual tumor was studied.

Results: 15 cases of PA, nine cases of PMA and one case of PA with anaplasia were identified. Visual symptoms were seen in almost all cases of PA whereas raised ICP and shorter duration of symptoms were noted in PMA. MIB index was variable in the PMA (1 to 15%) but was higher when compared to the PA (mean 1.5%). p53 and IDH mutation was also found to be negative in all cases of PMA. At follow up, one case of PA and two cases of PMA had tumor progression of which one patient expired. Two cases with high MIB index that had undergone radiotherapy were free of disease progression.

Conclusions: Clinical features of Pilocytic astrocytoma variants are in stark contrast with Classical PA. Third ventricular location of PMA may suggest a hypothalamic origin. There is an aggressive subset of PMA with CSF dissemination and early age of presentation. MIB-1 labeling index may be a marker to identify these.
Analysis for the recurrence of meningioma using $^{11}$C-methionine PET

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Objective:
Meningioma is usually treated with surgery, but the recurrence rate is not low even if gross total resection is performed. In some cases, we take a wait-and-see approach because of the tumor size, location or the patient's condition. It is important to assess the possibility of the tumor recurrence for the postoperative cases or the risk of the tumor growth for the follow-up cases.

Methods:
37 patients with intracranial meningioma who underwent $^{11}$C-methionine (MET) PET before treatment since 1995 to 2010 were enrolled. We performed surgical resection for 33 patients (Gross total resection: 18 cases, subtotal resection: 13 cases, partial resection: 1 case, biopsy: 1 case) and took a wait-and-see approach for 4 patients. We evaluated the characteristics, the histopathology, Ki-67 labeling index (LI) and lesion to normal ratio (LN ratio) of MET uptake.

Results:
6 patients had a recurrence in the surgical cases and 2 patients had a tumor progression in observed cases. The high LN ratio of MET uptake was the significant risk factors for recurrence and progression in univariate analysis. The area under the curve (AUC) of receiver operating characteristic (ROC) curve in LN ratio of the MET uptake was 0.754 and the optimal cutoff value was 3.18 (sensitivity: 63%, specificity: 79%). In multivariate analysis using Cox proportional hazards model, the high LN ratio of MET uptake, the non-gross total resection (GTR) and the high WHO grade were the significant risk factors for progression and recurrence.

Conclusions:
The high LN ratio of the MET uptake was one of the risk factors for tumor progression and recurrence. The advantage of MET PET is not invasive and to evaluate the whole tumor easily.
Papez circuit and adjoining limbic system: Analysis of anatomy by fiber dissection technique

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Introduction:
Fiber dissection techniques were used to study the limbic system in general and Papez circuit in particular. The course, length and anatomical relations of the structures that make up the Papez circuit were delineated.

Methods:
Ten previously frozen and formalin-fixed cadaveric human brains were used. The fiber dissection techniques as described by Klingler were adopted. The primary dissection tools used comprised of thin and curved wooden and metallic spatulas with tips of varying sizes.

Results: Papez circuit (mean length ; 350 mm) begins in the hippocampus, continues into the fornix to reach the mamillary body. From there, the mamillothalamic tract continues to the anterior nucleus of the thalamus, which in turn connects to the cingulum by means of the anterior thalamic radiations (mean length ; 30 mm). The cingulum courses around the corpus callosum to end in the entorhinal cortex which then projects to the hippocampus, thus completing the circuit. The average length and breadth of the mamillothalamic tract was 18 mm and 1.73 mm respectively. The average length of the cingulum was 19.6 cm and that of the fornix was 71 mm. The entire circuit was anatomically dissected first in situ in the hemisphere and was then reconstructed outside after removing its various components using fine fiber dissection with the help of surgical microscope.

Conclusions:
Fiber dissection elegantly delineates the anatomical subtleties of Papez circuit and provides a three dimensional perspective of the limbic system. Intricate knowledge of the anatomy of this part of the brain aids the neurosurgeon while performing epilepsy surgery and while approaching a variety of intrinsic brain parenchymal and ventricular and paraventricular lesions.
Clinical characteristics and predictors of surgical outcome in children and adolescents with temporal lobe epilepsy

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Aim: To assess the clinical characteristics, predictors of surgical outcomes and quality of life in children and adolescents with Temporal Lobe Epilepsy (TLE).

Methods: Retrospective analysis of pre-surgical, surgical and post-surgical data was performed in 80 children and adolescents with refractory TLE who underwent surgery with at least one year post-surgery follow up. Presurgical evaluation included MRI Brain, VEEG, ictal SPECT, FDG-PET, neuropsychological and developmental evaluation. Multivariate logistic regression analysis was done to determine predictors of outcome.

Results: There were 24 children (2-12 years) and 56 adolescents; 47 were males. The duration of follow up was 12-78 (mean: 38.4 months). The age of onset of epilepsy ranged from 4 months to 15 years. At the last follow up 18 (75%) children and 39 (69.6%) adolescents were seizure free. Hippocampal sclerosis was the commonest pathology noted in 76.8% of adolescents and 62.5% children. Focal cortical dysplasia (FCD) was more frequent in children (21%) than adolescents (12.5%). FCD was more common in children <10 years (38.4%). At last follow up improvement in IQ was noted in 75%, behavior in 74% and quality of life in 84%. Lateralized ictal EEG was a predictor of favorable outcome while acute post operative seizures predicted unfavorable outcome (p<0.05).

Conclusions: Children with TLE have favorable outcome with improvement in seizures, IQ, development and behavior after surgery. A well lateralized EEG was a predictor of favorable outcome, while acute post operative seizure is a negative predictor.
P3-2

Microanatomy of commissural fiber tracts of the cerebrum:
A cadaveric fiber dissection study

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Background: Detailed microneurosurgical anatomy of commissural fiber tracks of brain is not well elucidated in literature.

Objective: To study microanatomy of commissural fibre tracks of the cerebrum by fiber dissection technique. To describe three dimensional topography of anterior commissure, corpus callosum, hippocampal commissure and posterior commissure in relation to neighboring fasciculi and ventricles. Fiber dissection technique is a very relevant and reliable tool for neurosurgeon to study detail neuro anatomy of the brain.

Method: Six previously frozen formalin fixed human brains were dissected under operating microscope by dissection technique described by Kingler. Basal, superior and lateral approaches were taken to define their anatomy. primary dissection tools were hand made wooden spatulas with tips of various sizes.

Result: We exposed and studied Anterior commissure, corpus callosum, hippocampal commissure and posterior commissure. Each stage of dissection described in detail and recorded. A comprehensive understanding of three dimensional configuration of various fiber tracks acquired.

Conclusion: No other technique can provide a clearer three dimensional understanding of complex internal structure of the human brain. This knowledge of anatomy of connecting fiber bundles of the brain can be incorporated in pre operative planning process and applied to surgical strategies for deeper pathologies. In future, this knowledge will give be useful in interpreting diffusion tensor and other advanced imaging modalities.
P3-3

Epilepsy surgery in pediatric population: A retrospective study from a tertiary care hospital in a developing country along with assessment of quality of life.


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Purpose: To assess the outcome of pediatric population operated for drug resistant epilepsy from a large tertiary care centre in India.

Methods:
Study of 98 pediatric patients who underwent epilepsy surgery.

Results:
129 patients were operated from January 2000 - June 2009 by the senior author (corresponding). 98 patients had a follow up of at least one year and were included in the study. The mean age at surgery was 9.8 (± 4.3) years. In addition, 40 patients underwent quality of life assessment prospectively both pre and post surgery. The mean duration of epilepsy was 5.3 (± 3.3) years. Class I outcome (Engel’s score) was seen in 74/93 (79.5%) patients, Class II outcome in 8/93 (8.6%) patients, Class III outcome in 10/93 (10.7%) patients and Class IV outcome in 1 patient. If classified according to the surgical procedures, Class I outcome was seen in 29/38 (76.3%), 29/33 (87.8%) and 16/22 (72.7%) patients who underwent temporal resection, hemispherotomy and extra temporal resection, respectively.

Conclusions:
This study, one of the largest from India, has demonstrated satisfactory results for epilepsy surgery in children.

Key words: pediatric epilepsy, epilepsy surgery, temporal resection, hemispherotomy, corpus callosotomy, vagal nerve stimulation, quality of life
P3-4
Individual differences of the STN in order to more accurate DBS surgery

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Objective: While the STN-DBS surgery, we cannot see STN as a target directly. So we must suppose the shape, the size, and the location of the STN. Then it is very important to grasp the degree of the average and the individual differences about the shape, the size, and the location of the STN.

Materials and Methods: In this study, we composed ten 3D images of the STN on the computer from the digital photographs of the frozen serial sections of ten Japanese human hemispheres fixed with formalin. We clarified the 3D shapes of the STN, then we investigated the averages and the individual differences of the length of the long axis and the location of the center of each 3D STNs on the computer.

Results: The long axis of the STN ran from anteromedial-inferior to posterolateral-superior, and it was a mean of 10.7mm(9.1-12.1) long. Their individual differences were 3mm maximum. The location of the center of the STN was 11.9 mm(10.6-14.0) lateral from the midline, 1.1mm(0-2.3) posterior to the midcommissural point(MCP), and 2.7 mm(1.3-4.5) inferior to the line leading from the anterior commissure(AC) to the posterior commissure(PC) on average. Their individual differences were about 2-3mm.

Conclusions: After all we reconfirmed that it was essential to identify the location of the STN by the microelectrode recordings(MERs) in order to compensate these individual differences during the DBS surgery.
Role of CT myelogram in simulation and planning of vertebral hemangioma submerged neurosurgical operating environment: A theoretical construct

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Aims and objective:
Theoretical analysis of a novel operating environment for neurosurgery is attempted with input from available data from other fields. Potential advantages, possible difficulties that may be encountered and safety issues are discussed.

Method:
A new operating environment is proposed speculating significant and perhaps unexpected advantages. Real world data from other fields, especially the considerable experience from replicating microgravity environment in space research are used in this thought exercise. Potential advantages of using such a state, in terms of surgeon performance, maintenance of physiological milieu, physical advantages for operating certain equipments and optical differences of a fluid media are analyzed. Panoramic real time high resolution non-contact ultrasound of the operating field, removal of blood and debris using focused jets of fluid, maintenance of a wet physiological micro-environment akin to that exists within the intact cranium are few of the interesting possibilities. Adaptation of operating microscope and other equipment including intra-operative MRI are needed.

Results and conclusions:
Although seemingly unthinkable or even absurd, it is important to explore ways to enhance the physical capability of the man-machine-patient system in the highly demanding workplace of a neurosurgical operating theater. A submerged neurosurgical operating environment (SNOE) is essentially a physiological fluid filled suspending media where all elements of the operation theater are adapted to perform in a state of neutral buoyancy. As a theoretical construct it appears feasible to the extent that at some point in the future, an experimental realization of the system may be possible.
Our novel for surgical treatment for cervical compressive injury

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Introduction: Cervical compressive injury associates with bony injury. Although a minor fracture is often treated with a cervical collar or brace, a more severe or complex fracture may require surgical repair and/or spinal fusion. We present our novel of surgical treatment for cervical compressive injury.

Materials and Methods: We included 16 consecutive patients who underwent surgery because of cervical compressive injury. There were 3 women and 13 men with a mean age of 52 years (range 15-81 years).

Results: There is a case of screw breakage 5 years after anterior spinal fusion with cage and plate system. We have not confirmed any other implant failure.

Discussion: Compressive-flexion, compressive-extension, vertical-compression injuries share a common feature in that all undergo an axial load that contributes to their failure. A result of the axial forces is shortening of the injured portion of the spine. That’s why we should consider repairing the support structures as well as holding in correct alignment. We had been selecting circumferential fusion via combined approach in managing these cases. However, we can make enough rigid construct even with posterior approach due to the development of rigid implants.
Tuberculosis of spine: Management & outcome

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Introduction:
India has more cases of tuberculosis than any other country in the world. The diagnosis of spinal tuberculosis is difficult due to presentation at an advanced stage of disease. The management is complex and follow up is difficult due to diverse educational & economic background.

Objective:
A retrospective study was conducted on patients admitted at Tata Main Hospital between January 2006 to December 2011. The data was analysed for demography; their response to treatment and eventual outcome.

Patients and method:
254 Patients were evaluated with mean symptom duration of 3 months. Most patients did not have a previous medical history. Commonest presentation was vertebral pain in affected region followed by neurological deficits. Out of these 72 patients were treated conservatively and rest 182 patients surgically (with or without instrumentation).

Results:
Overall 184 (72.5%) patients showed excellent recovery. Moderate improvement was shown by 51 (20%) and mild or no improvement by 19 patients (7.5%).

Conclusion:
Tuberculosis spine is a common problem in India which is often diagnosed late in the course of the disease and hence a strong clinical suspicion is the key to early diagnosis. Judicious management strategy is essential for optimum clinical outcome in each case. Prognosis and eventual outcome is related to extent and duration of cord compression; age and general condition of the patient
Tuberculosis of thoracic spine: An analysis of 22 surgically treated children.

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Introduction:
Tuberculosis (TB) of spine (Pott’s disease) is dangerous form of TB in children. There is a recent upsurge of it, due to immune compromise and multi drug resistant strains.

Aim & Objective:
To study the clinical outcome of Pott’s disease in children up to age 18 years.

Material and method:
This is a retrospective study of 22 operated patients from 2006 to 2011. The clinical details, pre-surgery motor function, vertebral segments involved and the outcome were analyzed.

Results: The mean age was 11.8 years. The male to female ratio was 0.8. Constitutional symptoms of tuberculosis were present in 13 (59.1%) patients. Local pain and gait weakness are most common symptoms, present in 20 (90.9%) and 18 (81.8) cases respectively. Eight patients (36.4%) presented with complete paraplegia (Grade 0). The upper thoracic vertebrae involved in five (22.7%), middle in six (27.3%) and the lower thoracic vertebrae were involved in 11 (50%) cases. Single segment vertebra was involved in ten (45.5%) patients whereas two and three segment-vertebrae were involved in eight (36.4%) and four (18.2%) patients respectively. Surgery was done with anterior approach in seven (31.8%) patients. Posterior and postero-lateral routes were used in 15 (68.2%) patients. Spinal instrumentation was done in 4 (18.2%) patients. Seventeen (77.3%) patients showed early signs of improvement (either motor or sensory) during the hospitalization. At thirty-six months follow-up 21 patients (95.5%) improved in motor function. Correctable surgical complications occurred in two (9.1%) patients. There was no mortality.

Conclusion: Most of the pediatric Pott’s patients improve with surgery. Only few patients need instrumented stabilization.
Expanding pseudomeningocele of C5 C6 C7 following root avulsion

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Objective: We present a pseudomeningocele of the spinal cord which is a rare entity. They are usually seen after blunt trauma, bullet injuries and stab injuries. Pseudomeningocele formation after brachial plexus injury has been reported in 29% of cases.

Materials and methods: Our patient was a 46 year old gentleman who had suffered Right Brachial plexus injury following a road traffic accident thirty years ago which had left him with complete sensory and motor loss in his right upper limb. He presented with chief complaints of difficulty in walking since two years and change in handwriting. Clinical examination showed increased tone in both lower limbs and left upper limb. There was a complete sensory and motor loss in right upper limb. The gait was spastic. Clinical examination was corroborative with an upper motor neuron type of lesion and radiological examination gave the provisional diagnosis of C5 C6 C7 pseudomeningocele. He underwent C5 C6 C7 laminectomy and excision of pseudomeningocele with repair of dural defect.

Results: Surgery has prevented further progression of disease and the patient is on follow up since one year.

Conclusion: Brachial plexus root avulsion may result in formation of pseudomeningoceles and can lead to spinal cord herniation. The clinical presentation, diagnostic modalities, management and literature review are discussed.
Reduction in range of cervical motion on serial long term follow-up in patients undergoing oblique corpectomy for cervical myelopathy

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Object:
To determine whether motion preservation following oblique cervical corpectomy (OCC) for cervical spondylotic myelopathy (CSM) and ossified posterior longitudinal ligament (OPLL) persists with serial follow-up.

Methods:
We included 36 patients with preoperative and at least two serial follow-up neutral and dynamic cervical spine radiographs who underwent OCC for CSM (28 patients) and OPLL (8 patients). Changes in sagittal curvature, segmental and whole spine range of motion (ROM) were measured. Nathan’s system graded anterior osteophyte formation. Neurological function was measured by Nurick’s grade and modified Japanese Orthopedic Association (JOA) scores.

Results:
The majority (30 patients) had a single or 2-level corpectomy. The average duration of follow-up was 43.2 months. The Nurick’s grade and the JOA scores showed statistically significant improvements after surgery (p<.001). 20% of patients with preoperative lordotic spines had a loss of lordosis at last follow-up but with no clinical worsening. 75% of the whole spine ROM and 59% of segmental ROM was preserved at last follow-up. The whole spine and segmental ROM decreased by 12.1 and 11.5 degrees respectively (p= <0.001). Analysis of serial radiographs indicated that when OPLL was present (p=0.000), more than one-level corpectomy was done (p=0.003) and when the duration of follow-up was longer (p=0.000) there was a significant decrease in the whole spine and segmental ROM. Nathan’s grade showed increase in osteophytosis in two-thirds of the patients (p=<0.01).

Conclusions:
Although the OCC preserves segmental and whole spine ROM, serial measurements show a progressive decrease in ROM albeit without clinical worsening. The reduction in this ROM is probably related to degenerative ossification of spinal ligaments.
P4-1
Poor-man’s ICP monitoring system in TBI: An indigenous device in resource constrained setting.

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Objectives: ICP monitoring is an important parameter in managing TBI patients. In countries like India, intra-parenchymal ICP monitoring systems are not easily feasible & intraventricular monitoring is not preferred due to high infection rates and difficulty in placement in absence of ventriculomegaly. We tried to evaluate the feasibility and utility of indigenous, low-cost subdural ICP monitor in TBI patients.

Methods: This prospective study over 9 months duration included patients 18 years of age with GCS 12, who were admitted within 8 hours of injury. ICP was measured when there was no definitive operable finding on CT head. Patients having ventriculomegaly and/or coagulopathy were excluded. Sterile infant feeding tube (6FG), further softened by boiling, placed subdurally after making bedside burr-hole and connected to a CVP manometer; sterile saline used as coupling agent. Cost of consumables INR 337. Based on serial ICP recording (72 hours), patients were grouped as high ICP group(>20 cmH2O) & normal ICP group(<20 cmH2O). Outcome was assessed at 6 months with Glasgow Outcome Scale.

Results: Total 19 patients were analyzed, 14(74%) were severely head injured (GCS-3 to 8) and 5(26%) patients sustained moderate head injury (GCS-9 to12); all were male with mean age of 34 years. 14(73.6%) patients had high ICP, all of whom were subsequently operated. In the operated population mean GOS was 3 and in non-operated mean GOS was 4.5, at follow-up.

Conclusions: Our indigenous and cheap subdural ICP monitoring system is feasible, easy to use and may be an attractive alternative in resource constrained setting.
A prospective randomized study of use of subdural drain versus no drain after burr-hole evacuation of chronic subdural hematoma

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Objective: Chronic subdural hematoma is one of the most common type of intracranial hematoma especially in the elderly with significant morbidity and mortality. It recurs after surgical evacuation in 5-30% of patients. Inserting a subdural drain with closed drainage reduces the recurrence rate, but is not routinely practiced. There are but a few prospective randomized studies to evaluate the efficacy of subdural drains. Our aim was to investigate the effect of drains on recurrence rates and clinical outcomes.

Methods: We did a prospective randomized study at PGIMER & Dr R M L Hospital, New Delhi in which 142 consecutive patients with age between 23 and 95 years with a chronic subdural hematoma were enrolled. 58 patients were randomly assigned by Random allocation software to receive a drain inserted into the subdural space and 59 to no drain after evacuation. 25 patients who were either managed medically or the brain completely surfaced after evacuation of SDH were excluded from the study. The primary end point was recurrence needing re-drainage up to 3 months from surgery.

Results: Recurrence occurred in 6 of 58 (10.34%) patients with a drain, and 15 of 58 (25.42%) without drain which was statistically significant (p value 0.0253). The mortality was 4 of 58 (6.89%) in patients with drain and 4 of 58 (6.78%) in patients without drain. The medical (seizures, venous thrombosis, electrolyte disturbances) and surgical (infection, subdural empyema, pneumocephalus, intracerebral hematoma) complications did not show any statistical difference between the two groups.

Conclusion: Use of a subdural drain after burr hole evacuation of a chronic subdural hematoma is safe and associated with reduced recurrence rate and better outcomes.
Background: Achieving and maintaining hemostasis in neurosurgical procedures is critical to the outcome and challenging especially in cases of coagulopathy with diffuse oozing. After trauma to the brain, a cascade of events initiated by tissue factor (TF) or thromboplastin results in a defect in coagulation process that even may lead to disseminated intravascular coagulation (DIC). Fibrin glue is a sealant made up of fibrinogen and thrombin used for dural defect repair at the base, convexity, anastomosis of the nerve and nerve graft, reinforcing microvascular anastomosis. This study was carried out to determine the hemostatic effect of human fibrin glue on bleeding surface of brain and compare the effect with conventional methods of hemostasis.

Method: Thirty (30) white rats (Rattus norvegicus) were divided equally into study and control group. After craniotomy and dural opening a stab incision was made on right frontal region of brain. In case group the bleeding was controlled with fibrin glue (average 0.5 ml) and in control group conventional method of hemostasis (cautery, cottonoid patty, and saline wash, surgicel) was used. Both the groups were studied for bleeding time, seizure, neurological deficit, wound complications and mortality.

Results: Outcome was assessed as 1) Bleeding in both the groups 2) Complications in both the groups. It was observed that in study group the time taken in hemostasis was significantly less in comparison to the control, No significant difference in the post procedure clinical outcome and inflammatory reaction/gliosis reaction was found in both the groups.

Conclusion: Human fibrin glue is simple, easy and safe alternative to conventional methods of hemostasis.
Brain contusion presenting as delayed cerebral edema: A rare case report

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Objective: A rare case presentation

Patient: 52Y/F presented with delayed severe cerebral brain edema (two months post trauma) serial scan in between were not showing any contusion. Intraoperative found to have contused/inflamed brain in right frontotemporal region. HPE suggestive of contusion.

Conclusion: We have not found any reported case of contusion presenting as delayed severe cerebral edema. Nonhemorrhagic contusion may present as severe cerebral edema after two months of trauma.
P4-5
Role of repeat CT scan in the management of traumatic brain injury

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Background: In current trauma practice, a computed tomography (CT) scan is the initial study of choice to determine the type, extent and severity of traumatic brain injury as well as to determine the management protocol. However, there are no guidelines on the necessity or the value of repeat CT scan. The purpose of the present study was to determine whether serial CT scans demonstrated significant change from the findings in the first CT scan and whether repeat scans had influence on management options.

Methods: 201 patients of traumatic brain injury above 15 years of age were followed with serial CT scans for a maximum of up to 5 scans. Details like age, sex, time and mode of injury, interval between trauma and the CT examination, the Glasgow coma score, the findings on each CT scan, the type of brain injury, presence or absence of intracranial hematoma, type, site and number of intracranial lesions were recorded.

Results: Out of total 201 patients, 154 (77%) had no change in management on serial CT scans while 47 (23%) had change in management. 26(55%) decisions of change in management were based upon clinical deterioration and 21(45%) upon radiological changes only.

Conclusions: A higher incidence of surgical intervention was seen in patients who had the first CT scan within 6 hours of initial trauma. Also, the incidence of surgical intervention was higher when the repeat CT scan followed clinical deterioration than when it was done as a routine protocol.
P4-6

Does the impact of elective temporary occlusion on intra-operative rupture, really influence neurological outcome after clipping of ruptured anterior circulation aneurysms?: A prospective multivariate study

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Object: Elective temporary occlusion (ETO) is being increasingly used in surgical clipping of aneurysms to obviate the hazard of intra-operative aneurysmal rupture (IAR), albeit with the potential risk of ischemic deficit. This study was to assess whether the impact of ETO on IAR, translates into neurological outcome, independent of other factors.

Methods: Patients who underwent definitive clipping of ruptured anterior circulation aneurysms were prospectively studied for various factors related to ETO, IAR and neurological outcome at 3 months. ETO was utilized as per surgeon’s choice under normothermic, normotensive conditions. The standard surgical maneuvers including rescue temporary occlusion were employed during IAR. Univariate and multivariate analyses were performed in relation to various factors.

Results: Of the total 273 ruptured aneurysms’ surgical clipping studied, IAR was observed in only 6 out of 132 aneurysms (4.5%) who had ETO, as compared with 78 out of 141 (55.3%) without ETO (p<0.001). Aneurysms complicated by IAR had significantly longer total occlusion time (8.3 min) compared with those without IAR (1.9 min) (p<0.001). IAR had significant association with unfavorable outcome (38% with IAR vs. 24% without IAR) (p=0.02). Patients with ETO had significantly shorter total occlusion time (2.9 min) compared with those without ETO (4.8 min) (p=0.02). Of the 132 with ETO, only 30 had unfavorable outcome (23%), while out of 141 without ETO, 48 had unfavorable outcome (34%) (p=0.04). Among site-specific subgroups, this beneficial effect of ETO on outcome was more marked for MCA and DACA, followed by Acom aneurysms. While episodes of ETO within total occlusion time of 20 minutes did not show significant difference in outcome, repeated rescue occlusive episodes (45% unfavorable outcome, p=0.048) and total occlusion time of 20 minutes or more (75% unfavorable outcome, p=0.008) had significant impact on outcome. In multivariate analysis using binary logistic regression, the use of ETO (p=0.027) and total temporary occlusion less than 20 minutes (p=0.049) were noted to result in significantly better outcome independent of the effects of age, admission Fisher grade, preoperative WFNS grade, site of aneurysm, timing of surgery, and of each other.

Conclusions: In our study group, the use of ETO decreased the occurrence of IAR and the requisite total occlusion duration, thereby leading to better neurological outcome after clipping. This beneficial effect of ETO on outcome was independent of all known prognostic factors. While repeated elective occlusive episodes within the total occlusion time of 20 minutes did not influence outcome, repeated rescue occlusive episodes and total occlusion time of 20 minutes or more had significant impact on outcome. More liberal use of brief ETO before dissection of aneurysm may avoid the risks associated with both IAR and prolonged occlusion, possibly improving neurological outcome after surgical clipping.
Japanese superiority of outcome after subarachnoid hemorrhage

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Objective:
Now intravascular coil embolization (CE) for cerebral aneurysm is increasing in number in all over the world. However, in Japan the rate of CE for cerebral aneurysm is only about 25%. Furthermore, case fatality after subarachnoid hemorrhage (SAH) was lower in Japan than it was in other countries (Lancet Neurol. 2009). In this paper, we discuss about the superiority of outcome after SAH in Japan and feature of Japanese neurosurgery and medical system.

Subjects and Methods:
We investigated Japanese stroke data bank (JSDB) and OECD health data. After comparison JSDB and ISAT (Lancet 2002) data, analyzing OECD health data, we will clarify feature of Japanese neurosurgery and medical system.

Results:
According to JSDB, the rate of good outcome (mRS 0-2) of ISAT criteria patients is 89.3% and 76.3% in surgical clipping (SC) and EC group, respectively. This rate was superior to ISAT data (64.6% by SC and 74.6% by EC). By OECD health data, Japan has most CT, MRI, hospitals and beds; best life expectancy and infant mortality rate in the world. Japanese neurosurgeons has less surgical cases than in other countries by over five southland members, however, can take more time on operation and provide smooth treatment on the universal care system.

Conclusions:
In Japan, not only so many modalities, hospitals and neurosurgeons but also vascular surgical technique can improve outcome after SAH.
P4-8
Surgical treatment for vertebral artery-posterior inferior cerebellar artery aneurysms: Special reference to the importance of the cerebellomedullary fissure dissection

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Object: The cerebellomedullary fissure (CMF) is a space between the cerebellum and the medulla oblongata, which are often adherent to each other. The purpose of the present study is to demonstrate the importance of the unilateral CMF dissection for clipping vertebral artery-posterior inferior cerebellar artery (VA-PICA) aneurysms.

Methods: Five adult cadaveric specimens were studied using 3x to 40x magnification, after colored silicone was infused into the arteries and veins. The microsurgical anatomy of the CMF and the trans-CMF approach for VA-PICA aneurysm surgery were examined in stepwise dissections. Six patients underwent surgery for VA-PICA saccular aneurysms (two ruptured and four unruptured ones) via far-lateral or transcondylar fossa approaches with wide opening of the unilateral CMF to obtain a good visualization and a wide working space in the lateral part of the cerebellomedullary cistern. Clinical data including neurological and radiological findings and patients’ outcomes were analyzed in all the 6 cases.

Results: In all cases the aneurysm was successfully clipped and no permanent neurological deficits remained. The wide opening of the unilateral CMF on a lesion side made it possible to retract the cerebellum easily and provided a wide operative field in the cerebellomedullary cistern and successful clipping without difficulty.

Conclusions: For a VA-PICA aneurysm surgery, it is very important to dissect the CMF on a lesion side and to remove the lateral part of the foramen magnum. Direct clipping surgery is very safe and useful in cases of the VA-PICA aneurysm.
A basilar trunk giant aneurysm in a child mimicking a posterior fossa mass

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Introduction
The incidence of aneurysms in children is between 0.6 - 4.6 %. About 28 % present in the posterior fossa. Giant aneurysm in posterior fossa in a child is an extremely rare presentation.

Case report
An eight -year- old male child presented to a neurosurgical centre elsewhere with recurrent episodes of neck pain for six months. On examination he had lower cranial nerve paresis and cerebellar signs. MRI brain showed an extra axial mass lesion in the posterior fossa with evidence of bleed within the lesion. An attempt to excise the lesion revealed it a vascular pathology. Further evaluation in form of digital subtraction angiography at our institute revealed fenestrated proximal basilar artery with a 3.1 x 2.6 cm sized aneurysm arising distal to it. The aneurysm was managed successfully by a single sitting combined endovascular and surgical approach with good outcome.

Discussion:
Posterior fossa giant aneurysm in a child is an extremely rare presentation. The symptoms secondary to mass effect is a rare presentation of an aneurysm in children. These lesions mimicking mass lesions have been described in a few case reports. We describe this unique clinical presentation and its successful management in an eight- year old child.

The combination of endovascular and skull base surgical techniques is essential in the management of basilar trunk giant aneurysms with good outcome.

Conclusion
We describe the successful management of a giant posterior fossa aneurysm which mimicked a posterior fossa space occupying lesion.
A case of isolated transverse sigmoid sinus dural arteriovenous fistula in which ipsilateral sensory neural hearing loss developed after transvenous embolization: case report

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A 72 year old male patient complaining pulsatile tinnitus was diagnosed with isolated transverse-sigmoid sinus dural arteriovenous fistula (dAVF). This d-AVF was successfully treated by transvenous embolization (TVE) via contralateral approach. 10 days later ipsilateral sensory neural hearing loss appeared. To our knowledge there was no previous report describing such a complication after TVE for d-AVF. In this report we propose a hypothesis as follows. Due to high pressure AV shunt, inner ear might use alternative drainage root which depends on the minor collateral vessel preoperatively, which diminished after transvenous embolization, then inner ear congestion occurred and caused hearing loss. The validity of this hypothesis is discussed.
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