Guidelines for Skull base Surgery

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There should be a team in which there are recognized and dedicated members. These will includea Neurosurgeon, ENT surgeon, Endocrinologist, Radiation Oncologist, Medical Oncologist, NeuroOpthalmologist, Diagnostic & Interventional Neuroradiologist and Neuropathologist as well as an Intensivist.

There should always be a team work in which the team members should meet regularly, discussing the recent advances and work for the betterment of the field.

All the cases should be discussed preoperatively between Neurosurgeon and ENT surgeon with scans to decide the best route for the surgery in terms of approach, morbidity and recovery.

An ENT surgeon should have following expertise;

1. Should be experienced enough.
2. Should have very thorough anatomical and clinical knowledge.
3. Should be attached to the institution with proper infrastructure.
4. Should be able to work in team with neurosurgeon.
5. Should have performed enough Endoscopic Sinus Surgeries including Draf-3 procedures and Sphenoid surgeries.
6. Should be able to deal with bleeding effectively.
7. Should have done enough CSF leak repairs.

8. Should be able to communicate with patients and their relatives regarding Pre & Post operative counseling.

INSTITUTE WITH PROPER INFRASTRUCTURE

Multidisciplinary collaborative environment that includes not only experienced practitioners in neurosurgery and endocrinology, but also in otorhinolaryngology, radiation oncology, medical oncology, neuro-opthalmology, diagnostic and interventional neuro-radiology and neuro-pathology.

An institute should be include;

1. Commitment to excellence
2. High numbers of surgical volumes
3. Designated medical director
4. Responsive critical care support
5. Appropriate equipments and instruments in OT like
    - HD camera system with recording facility
    - Navigation system
    - Transnasal Doppler
    - All requisite instrumentations, especially pistol grip electrocautery and cutting instruments
    - Haemostatic materials
    - Capability for interventional radiology in OT
6. Should have CT & MRI facility
7. Clinical pathways and standard operating procedures
8. Post-operative intensive care unit
9. Specialized nurses, physician extenders and programme coordinator
10. Patient support group
11. Long term patient follow up with longitudinal database
12. Comprehensive care and support to patients

13. Residency training and continuing medical education and research in the management of pituitary and other neuroendocrine disorders

We also request a reading of the following chapter, excerpts of which are presented below. These give a sensible approach to learning skullbase surgery.

Kassam AB, Gardner PA (eds): Endoscopic Approaches to the Skull Base. ProgNeurol Surg. Basel, Karger, 2012, vol 26, pp 222–231

The Learning Curve for Endonasal Surgery of the Cranial Base: A Systematic Approach to Training

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The most important feature of a training program is the building of team surgical skills.

Additional challenges include assembling a team of surgeons that can work together consistently and build necessary team skills, having an adequate volume of cases to develop and maintain surgical expertise, and garnering adequate institutional resources and equipment.

Within otolaryngology, cranial base surgery was historically an extension of oncological head and neck surgery and surgeons received additional training through fellowships in cranial base surgery. They were knowledgeable of skull base anatomy, well equipped to repair large dural defects with regional flaps, and shared a philosophy of oncological principles with their head and neck brethren. However, they often lacked endoscopic expertise and did not use the endoscope routinely in other parts of their practice. In contrast, the rhinologist was facile with the endoscope but lacked a thorough understanding of skull base anatomy and did not have the skill set to undertake open approaches to the cranial base and reconstruction if needed. Although most traumatic and spontaneous CSF leaks were being treated endoscopically, there was little experience with the endoscopic recon- struction of large postsurgical dural defects. The neurosurgeon had multiple potential pathways to cranial base surgery, either through traditional fellowship training in cranial base surgery, pituitary surgery, or vas- cular surgery. Endoscopic experience, if present, was limited

Currently, debate still continues over the relative merits of the endonasal approach compared to other approaches but it is becoming a viable option in most medical communities. Of greater concern is the ability to switch between surgical approaches when warranted, to obtain clear resection margins and to deal with com- plications of hemorrhage or the challenges of reconstruction. Although these can be accomplished by separate teams of surgeons in the same institution, it is preferable if an endonasal surgeon can convert to an open approach in an emergency situation. Finally, training in multiple pathways provides exposure to different surgical philoso- phies. Importantly, the use of the endoscope should not alter oncological principles and result in less than complete surgery.

Based on our experience, we devised a training program that reflected our own learning (table 1) and incorporates levels of training that is incremental and modular [2]. These lev- els encompass multiple factors including anatomical knowledge, technical difficulty, potential risk of neural and vascular injury, extent of intradural dissection, and type of pathology. Mastery of each level is recommended before proceeding to the next level. The levels are designed to apply to all endonasal cranial base surgeons, irrespec- tive of their primary specialty.

Training levels for Endonasal Skull Base Surgery

Level I Sinus surgery

performing a complete sphenoethmoidectomy and sphenopalatine artery ligation

Level II Advanced sinus surgery Cerebrospinal fluid leak Intrasellar – sella, pituitary

includes exposure of the lateral recess of the sphenoid sinus via a transpterygoid approach, medial decompression of the orbit, and endoscopic frontal sinusotomy. Endoscopic repair of CSF leaks provides neces- sary experience with the repair of dural defects and endoscopic pituitary surgery pro- vides the opportunity to master hemostatic techniques. It is essential that the surgical team be comfortable performing these procedures together before undertaking more complex skull base procedures.

Level III Extrasellar – sella, pituitary Optic nerve decompression Intraorbital surgery Extradural skull base surgery

For many surgical teams, this is a good place to stop, especially if pituitary

surgery is the main focus of the practice. In order to safely perform more complex surgeries with intradural dissection, there should be a sustained commitment to endonasal skull base surgery with regular collaboration between specialties on lower level cases. There should be a sufficient volume of cases so that the surgical team can maintain proficiency. There needs to be a similar commitment on the part of the institution so that adequate resources are available such as equipment, operative time, and support staff. In the absence of training in open cranial base surgery, intradural dissection is not recommended.

Level IV Intradural skull base surgery

A. With cortical cuff

TransplanumTranscribriform

Type I craniopharyngioma

Intradural skull base surgery

B. Without cortical cuff

Type II/III craniopharyngiomaTransclival, intradural

Level V Coronal plane, carotid dissection Vascular surgery

It is important to note that the meager volume of cases early in this series reflected a predominantly pituitary practice with level II procedures (intrasellar pituitary adenomas, CSF leaks). Over the first 4–5 years, we gained experience with dural reconstruction and hemo- static techniques, resolved issues with instrumentation, and mastered the complex endonasal anatomy of the skull base [10]. Only then did we start to do more challeng- ing level III and IV procedures. As the complexity of cases increased, the size of dural defects also increased and dural reconstruction became more challenging

Based on our experience, it is difficult to state how many cases are required to achieve surgical proficiency. We propose that at least 30–50 level II surgeries (CSF leaks and pituitary tumors) should be performed before proceeding to level III cases.