Endoscopic transphenoidal hypophysectomy – personal experience of the development of a new surgical technique

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The introduction of new surgical techniques is often challenging. Laparoscopic surgery was enthusiastically adopted when first introduced but suffered bad publicity due to an increased complication rate when compared with the earlier 'open' surgical procedures that it had replaced. It is now inconceivable that surgeons would routinely offer patients 'open' cholecystectomy and laparoscopy has become the accepted norm. I first seriously considered the use of endoscopes in the performance of transphenoidal hypophysectomy in 1998. At that time I was performing microsurgical pituitary resections through a submucosal, transnasal approach while my colleague used a sublabial incision. Although the microscope affords good illumination and 3D perspective it suffers from a narrow field of vision when operating at depth through a relatively narrow approach. I was frustrated by the inability to see around corners and in particular to inspect the lateral and superior aspects of the tumour cavity after resection of macroadenomas. I had also been made aware of some of the problems encountered by patients after transnasal and/or sublabial surgery. Numb teeth, septal perforation, adhesions of turbinates with airway obstruction, prolonged nasal discharge and foul smells were all occasionally described due to the trauma inflicted by the approaches and by packing of the sphenoid sinus with fat and muscle to prevent cerebral spinal fluid (CSF) leaks.

We subsequently acquired the necessary equipment to develop endoscope-assisted pituitary surgery. We continued to perform the surgical approaches using the microscope but after resection of the tumour we then introduced the endoscope to inspect the tumour bed in the hope that additional fragments could be seen and removed under endoscopic vision, improving the surgical outcomes. This technique obviously did not address the nasal complications sometimes seen but was considered to be a 'stepping stone' to the development of truly endoscopic surgery. It was then that I became aware of a 'minimally invasive' training course, run in Germany, where for the first time I was shown the endonasal endoscopic approach to the sphenoid.

With the help of my functional endoscopic sinus surgery (FESS)-trained ear nose and throat (ENT) colleague we undertook the early surgery as a two-person team until I had accumulated enough endoscopic experience to perform the operations single handed. A range of instruments specific to the endoscopic approach was developed, reducing the operating time and facilitating tumour resection. The indications for endoscopic surgery were widened to include anterior fossa meningiomas, intradural suprasellar cysts and craniopharyngiomas. The exchange of ideas and techniques between FESS and neurosurgery significantly altered my practice. I had been taught to clean the nose with ribbon gauze soaked in antiseptic, to infiltrate the nasal mucosa with local anaesthetic and adrenaline and to remove the sphenoid sinus mucosa completely once the sinus had been opened. All of these practices were abandoned and the only useful nasal preparation was effective mucosal vasoconstriction to reduce intraoperative bleeding.

In the event of a CSF leak I no longer pack the sphenoid with fat and fascia harvested from the leg, instead a patch of collagen is laid over the defect and held in position with 'tissue glue'. I no longer stand to operate, preferring to sit and work with the endoscope stack system in front of me at eye level. We started endoscopic hypophysectomy using a two nostril approach but evolved to using the right nostril only for the majority of cases to reduce the nasal trauma inflicted. The remainder of the operation is then very similar to microsurgical resection. The keel of the sphenoid is resected, the fossa opened exposing the dura and the pituitary tumour removed. Vision is very much better with the endoscope than the microscope enabling a view of the sphenoid sinus that I had never seen before, as well as the ability to look into the tumour cavity to identify any residual adenoma.

Inpatient stay in the neurosurgical unit is no shorter as a result of endoscopic surgery. In my unit patients remain until it is safe to return them to the endocrinology ward, usually 48 hours after the operation. This is prolonged in the event of a CSF leak, primarily because of the lumbar drain which is generally best managed by experienced neurosurgical staff.

Time is required to become familiar with new techniques, regardless of the number of courses attended or cadaver dissections performed. These are both ways to reduce risk to the patient but there is no doubt that I am more skilled now than I was when I first started using the endoscopic method.

I have analysed the results of my first 100 patients treated endoscopically, dividing them into three roughly equal cohorts. The results suggest that there was a slightly higher risk of revisional surgery for CSF leak in the first 20 to 30 cases which reflected a more aggressive approach to tumour resection coupled with a lack of recognition of the leak intraoperatively with consequent failure to undertake an appropriate repair. I have been criticised by experienced pituitary surgeons for using the expression 'learning curve' for fear of encouraging litigation in the event of a complication while developing the technique. All surgeons have to start from a level of experience that is relatively low and regardless of their level of seniority, all will have to develop new skills as surgical practice evolves and improves; failure to develop these techniques will leave the profession open to criticism also. After six years of experience with endoscopy I would now not wish to return to microsurgery as I believe the patient experience is generally better and the results of surgery at least as good if not better than with microsurgery.