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## **DEPARTMENTAL GUIDELINES - CSF RHINORRHOEA**

Traditionally anterior skull base CSF leaks were managed via anterior craniotomy and intracranial repair with fascia lata.

This had a success rate around 70% and often had some loss of sense as smell as well as the risk of postoperative epilepsy.

Since the late 1980's endoscopic repair of CSF leaks has become the norm with a success rate in excess of 90% and minimal associated morbidity.

Various materials are used: free and pedicled mucosal grafts, fat, fascia, muscle and synthetics. Have similar success rates but the purely 'onlay' technique has a higher failure rate than techniques placing material between the dura and the bone of the skull base.

### **AETIOLOGY**

- Trauma
- Spontaneous
- Meningoencephalocoele
- Iatrogenic

#### **Traumatic**

Usually follow anterior skull base fracture

Initial management conservative because most leaks cease spontaneously in 10 days of injury

If they persist beyond this they should be closed surgically

One of main causes of continued leakage is a bony spicule in the fracture and this should be sought and removed at time of surgery

#### **Spontaneous**

Usually seen in the cribriform plate or lateral wall of the sphenoid sinus

- Cribriform leaks often result from dilatation of dural sheath around olfactory fibres, resulting in a small prolapse of dura and leak from the prolapse
- Sphenoids that leak are usually well pneumatized into the clinoid process, bringing the sphenoid into contact with the temporal lobe region of the middle cranial fossa, with only thin bone separating the two

It is thought that some of these may leak as a result of undiagnosed benign raised intracranial pressure in addition to the situations above

## Meningoencephalocele

Meningoencephaloceles may either be spontaneous (congenital or acquired) or associated with a traumatic event

Congenital meningoencephaloceles usually present within first few years of life, consisting of meninges and dura containing CSF with a varying amount of brain tissue, prolapsing through the skull base defect into the nasal cavity or sinuses.

Post traumatic meningoencephaloceles often have funnel-shaped defect in the skull base caused by the intracranial contents protruding through the defect and pushing the edges of the defect downwards into the nasal cavity / sinuses

### Iatrogenic

Frequently seen on the lateral wall of olfactory fossa and fovea ethmoidalis. The bone is very thin (1 to 0.1 mm) and damaged if the dissecting instruments are turned medially during surgery or if the surgeon loses orientation and fails to recognise that the skull base has been reached.

Laceration of the anterior ethmoidal artery with bleeding may be cauterised with unipolar diathermy, burning through bone and dura with resultant CSF leak.

Generally these leaks are immediately apparent and can be fixed.

## **ASSESSMENT OF SUSPECTED CSF LEAK**

Most reliable is to test the clear, watery secretions for  $\beta 2$  transferrin – this is only present in CSF and a positive test confirms a leak.

Once confirmed, the site of the leak is sought by a **high resolution, fine cut** CT scan of the sinuses, looking for dehiscences of the anterior skull base. Presence of fluid in sinus(es) may indicate the vicinity of the leak, allowing closer scrutiny of a particular area.

If the site of the leak is not apparent on CT scan, a high-resolution T2-weighted MRI may allow visualisation of fluid within sinus(es) or the actual site if leakage occurs at time of scanning.

All suspected meningoencephaloceles should have preoperative MRI, allowing brain within the meningoencephalocele to be identified and the opinion of the neurosurgeon should be sought regarding resection of this tissue transnasally.

Patients with spontaneous leaks without any evidence of bony dehiscence or opacified sinus(es) should have the cribriform plate region scrutinised intraoperatively because it is usually the most likely source of the leak.

If the site of the leak is not able to be determined the patient should have intrathecal fluorescein injection into the CSF space while under general anaesthesia



## **KEY POINTS**

- CSF leak cannot be closed if it is not identified
- Intra-thecal fluorescein - controversial but widely and safely used for this purpose
- Lumbar drain kept in for 24 hours to prevent any sudden rises in CSF pressure putting excessive strain on the repair
- Any concern of intracranial structures (esp. vasculature) being damaged intra-op should be allayed by appropriate radiological imaging pre-op
- If doubt exists about resection of dura / meninges / brain tissue, neurosurgical opinion must be sought