

CSF RHINORRHOEA: ENDOSCOPIC MANAGEMENT AND OPERATIVE TECHNIQUES

Andrew C. Swift
Consultant ENT Surgeon
University Hospital Aintree
Liverpool



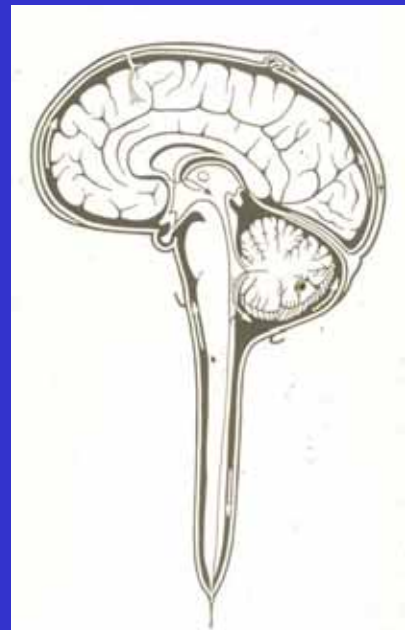
Alexandria 18th – 21st April 2007

Basic Physiology of CSF

CSF circulates in the subarachnoid space

Average volume	150ml
Rate of production	500ml/day
Pressure	60-150 mmH₂O

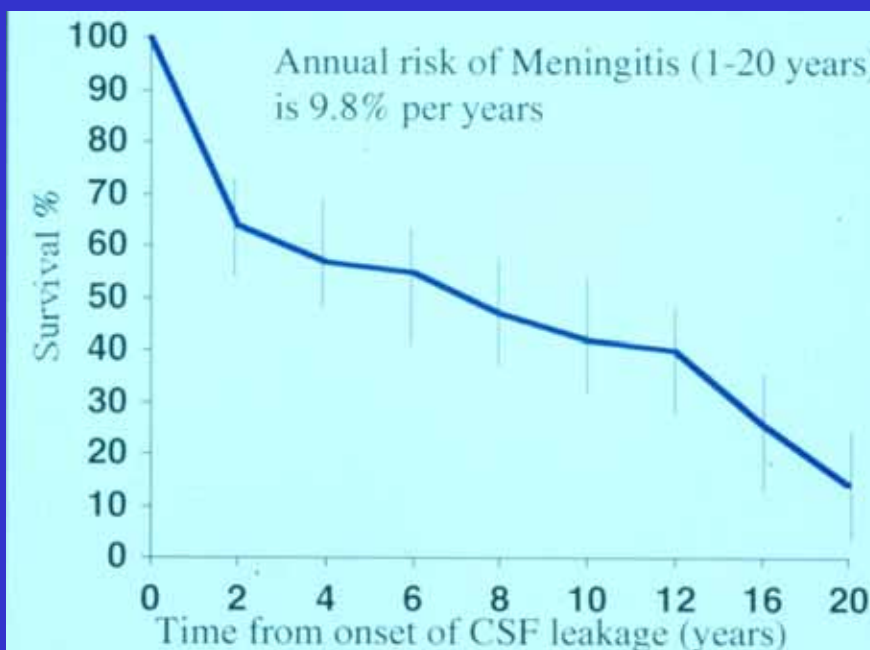
Very low protein
Few cells



WHY EXPLORE THE ANTERIOR SKULL BASE ?

- **NATURAL HISTORY:**
70% leaks stop after 3 weeks
- **CONSEQUENCES:**
Cumulative risk of meningitis of 10% per year

Survival free from meningitis: 253 patients



El-Jamal 1990

Presentation of CSF leaks

Watery nasal discharge

Recurrent meningitis

Sample:

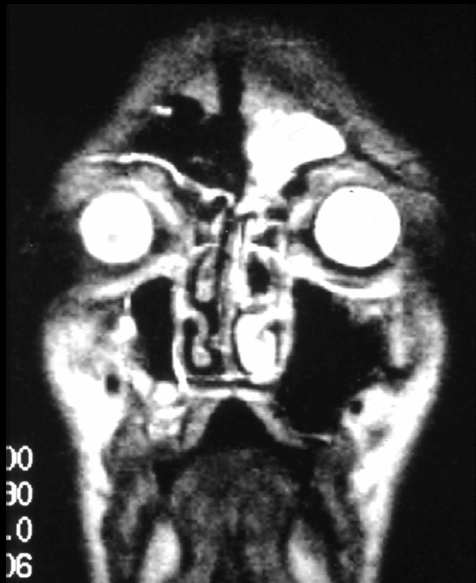
Beta-2 transferrin



Imaging for CSF rhinorrhoea: CT



Imaging for CSF rhinorrhoea: MR



Intrathecal fluorescein

- Lumbar puncture 2 hours before surgery
- Fine 25 gauge needle
- Keep patient supine / head down
- Dose: Adults
 - 50mg purified fluorescein



CSF RHINORRHOEA

Intrathecal fluorescein



Risks of Intrathecal Fluorescein

- ❖ **Complications rarely seen**
 - Status epilepticus
 - Lower limb weakness
 - Opisthotonus / Cranial nerve deficits
- ❖ **Tests for Sensitivity**
 - Patch test
 - Intravenous test dose 25mg fluorescein

Intrathecal fluorescein

- **Is it essential ?**
- **The difficult lumbar puncture**
Image control

Topical fluorescein

CSF RHINORRHOEA **Location of defect**

- ❖ **Diagnostic Rigid Endoscopy or,**
- ❖ **Endoscopic exploration of anterior skull base**
 - **cribriform plate**
 - **fovea ethmoidalis**
 - **frontal recess**
 - **sphenoid sinus**
 - **Eustachian tube**

Repair of CSF leaks: grafts

Types: Autograft / allograft / xenograft

Donor site: Nose
mucosa / turbinate / cartilage

Thigh / Abdomen
Fat / Muscle / Fascia

Operative techniques: Repair of donor site

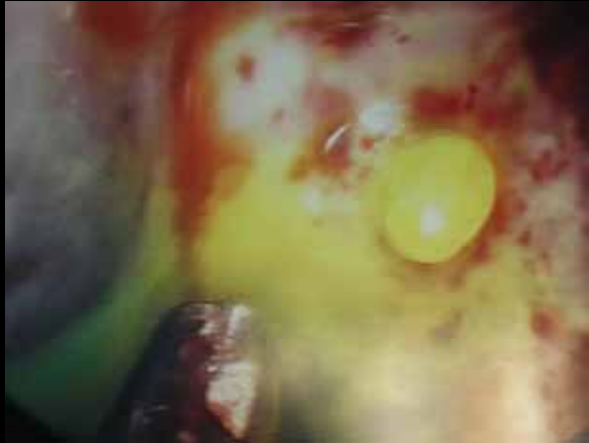


Prolene mesh

OPERATIVE TECHNIQUES

The Sphenoid Sinus

- 57 yr old man
- Spontaneous leak right nose
- Meningitis 7 weeks later



OPERATIVE TECHNIQUES

The Ethmoid

- 57 year old man
- Watery left sided rhinorrhoea after minor head injury
- Asymptomatic polyps



CSF RHINORRHOEA: Tips for successful repair

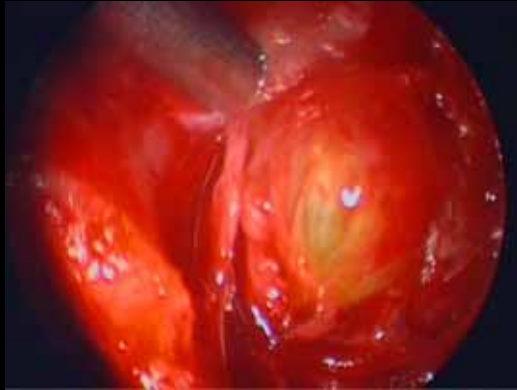
- ❖ Preparation of graft site
- ❖ Graft placement and fixation: *Fibrin glue*
- ❖ Confirmation of a successful seal: *Fluorescein*
- ❖ Graft support
- ❖ Graft integration and tissue reaction

Difficult problems: Multiple leak sites

54 year old woman
Diabetic and obese
Recurrent spontaneous leaks

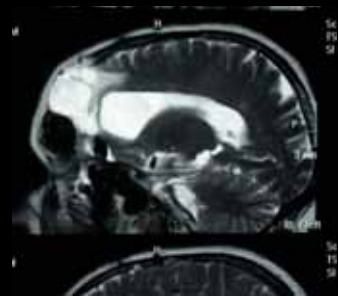


Difficult problems: Multiple leak sites The Frontal sinus



Difficult CSF leaks: Diagnostic/location problems

- 67 year old woman
- Leak left nose 5 months
- Excision of meningioma 3 yrs ago

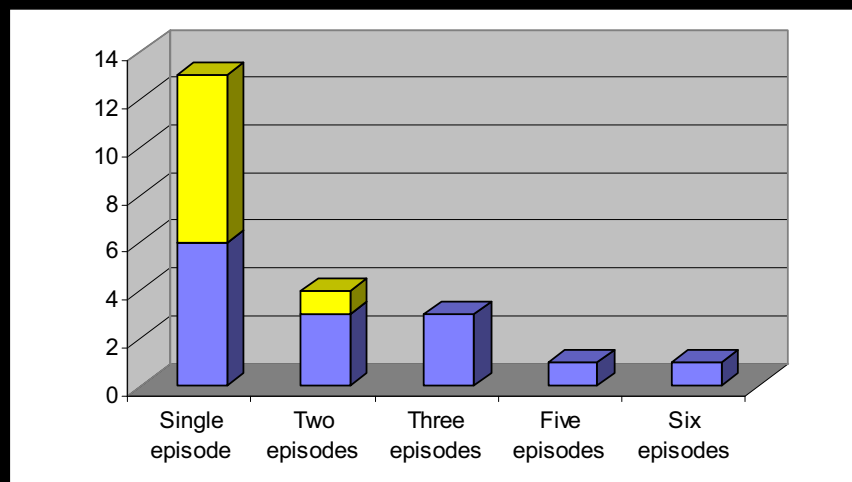


Difficult CSF leaks: Diagnostic / location problems



CSF rhinorrhoea: Meningitis (73 patients)

Pre-operative meningitis: 19



Recurrent meningitis after repair
3 patients 1-10 yrs post-op.

CSF RHINORRHOEA: OUTCOME

Outcome since 1990

73 Patients

- ❑ Persistent / recurrent CSF rhinorrhoea
within a few weeks of surgery 6 (8%)

- ❑ Subsequent leak or meningitis
9 months to 12 years after repair 11 (15%)
– 7 from a completely different site

Difficult problems: Profuse CSF rhinorrhoea

Significant acute loss of CSF

Acute onset cranial nerve defects

Confusion



CSF RHINORRHOEA: Post-operative care

- ❖ **Recovery and Nursing procedures**
 - ❖ **Antibiotics**
 - ❖ **Nasal packing**
-
- ❖ **Lumbar drains**
 - ❖ **Medical treatment: Bromocriptine**

Difficult CSF leaks: The Frontal Sinus

16 yr old man / Fracture skull
Left ethmoid repair X2
Multiple separate leak sites



CSF RHINORRHOEA: MANAGEMENT AND OPERATIVE TECHNIQUES

Team approach with neurosurgeons

- ❖ How we manage the problem
- ❖ Why we use our protocol
- ❖ How dural defects are repaired
- ❖ What are the results

CSF LEAKS: IMAGING TECHNIQUES

Current protocol: University Hospital Aintree, Liverpool

- ❖ **CT:** High resolution multi-slice spiral scan
Bone algorithms
Multiplanar reformats
- ❖ **MR:** T2 weighted images
coronal, axial and sagittal planes

Fluorescein



CSF RHINORRHOEA: OPERATIVE TECHNIQUES

Several possible techniques of repair

- Underlay
- Overlay
- Bath-plug technique