**Cerebrospinal Fluid (CSF) Leakage Cases**

**Cerebrospinal fluid leakage in olfactory groove tumour - Case report and analysis**

Case report and analysis of cerebrospinal fluid leakage in olfactory groove tumour, micro pituary adenoma, meningoenchepalitis and grade 1 meningioma

Paper details:

Make a Case report and analysis of cerebrospinal fluid leakage in olfactory groove tumour, micro pituary adenoma, meningoenchepalitis and grade 1 meningioma, base on the file I attach, make an introduction that showing the aim of the study, the importance of this study and the novelty of this study. Make a case description base on the file I attach. Make a disccussion about comparison of the four cases that I attach in file that I attach. Make a conclusion base on the aim of the study and tha case reprot that I attach. Use Vancouver System to write down the refferences system.

**CASE 1**

A 48-year old man presented with progressive chronic headache, decreased visual acuity (VA) in both eyes (worse in left eye), loss of sense of smell, and personality change in the past 7 months prior to surgery. Physical and neurological examination findings included frontal lobe syndrome, right eye VA of 1/300, left eye VA of 1/~, and anosmia. Pre-operative magnetic resonance imaging (MRI) showed a 5.7 x 5.5 x 6.7 cm lesion in frontal-basal region, isointense in non-contrast T1-weighted sequence, which enhanced homogenously with contrast. From T2-weighted and FLAIR sequences, the lesion appeared to be iso-hypointense, which correlated with the solid nature of the lesion. A diagnosis of olfactory groove tumour was made, with meningioma became the pathology most considered. A sub-frontal craniotomy was performed, and gross total removal of the tumour was achieved and confirmed through postoperative CT. Pathological finding fitted the description of meningotheliomatous meningioma (WHO grade 1). Immediate post-surgical complication was minimal. A week after the surgery, rhinorrhoea was found, with no other complaints. The patient was admitted with the diagnosis of post-operative cerebrospinal fluid (CSF) leakage and underwent two-weeks of observation in full recumbent position, with the administration of meningitis-dose antibiotic, acetazolamide, and potassium chloride. Rhinorrhoea persisted after the conservative management. Surgical approach was then opted to resolve the condition. Intraoperatively, a defect, believed to be the source of CSF leakage, was identified at cribriform plate. Defect closure using bone wax, periosteal flap, and fibrin glue was done, and continuous lumbar drainage was placed, ensuring the good seal of the defect. One week after the procedure, continuous lumbar drainage was removed, and no further rhinorrhoea was identified.

**CASE 2**

A 27-year old woman presented with increase in body weight, chronic electrolyte imbalance, and recurrent syncope in the past 6 years prior to surgery. She was assessed by an internist with Cushing syndrome, and was consulted to the neurosurgery department with chronic abnormal cortisol level. Physical examination revealed signs of fatty hump between the shoulders, rounded face, and pink striae on her abdomen. Neurological examination did not reveal any disturbance in visual acuity nor field. Pre-operative magnetic resonance imaging (MRI) showed a small iso-hyperintense lesion in sellar region, which enhanced after contrast administration. A working diagnosis of micro pituitary adenoma was made. A trans-sphenoidal surgery was performed, with intraoperative findings matched for pituitary adenoma. Post-operative CT did not reveal any residual lesion. Histopathological finding fitted the description of pituitary adenoma. The patient was admitted for five days after the procedure and was discharged with no complication. Nine days after the surgery, she complained of clear salty nasal discharge, which displayed halo sign in povidone-iodine test, positive for CSF leakage. The patient was then admitted for two-weeks, with similar protocol applied as aforementioned. The condition did not resolve by the end of the observation period. Trans-sphenoidal defect closure, using pedicle nasoseptal flap, was performed, and continuous lumbar drainage was placed. Seven days after the procedure, continuous lumbar drainage was removed, and no further rhinorrhoea was identified.

**CASE 3**

A 60-year old woman presented with progressive blurred vision, particularly left eye, for the past 1,5 years. No history of enlargement of fingers and toes, nipple discharge, decrease in body weight were found. She went to an ophthalmologist, who diagnosed her with autoimmune disease. Medical therapy with steroid eye drops were prescribed, with no improvements achieved. After one year of therapy, the visual acuity of both eyes had reached the level of total blindness. A brain MRI was performed, with sellar region tumour identified. She was referred to our department, and trans-sphenoidal surgery was commenced to remove the tumour. Fibrin glue was applied to seal the operative defect. She was then discharged after five days of admission with minimal complication. No complaints of post-nasal drip nor nasal discharge was ever present. Eight days after the surgery, the patient suffered from common cold, where recurrent sneezing was recorded. The day after, she complained of clear, salty, nasal discharge, accompanied with severe headache. A visit to the emergency department was made, where she was diagnosed with CSF leakage. She was then admitted for 14 days, with administration of antibiotic and acetazolamide were given, and full recumbent position was instructed. During admission, the patient progressively suffered loss of consciousness, lethargy, and nuchal rigidity. On the 14th day, nasal discharge persisted, with the patient in moribund condition. The next day, she was pronounced dead, with the diagnosis of meningoencephalitis as the cause of death.

**CASE 4**

A 30-year old woman presented with right forehead and temporal hyperostosis, which had been managed through a craniectomy procedure. A histopathology diagnosis of WHO grade I meningioma was made. She then underwent two similar procedures, plus a mastoidectomy by ENT specialist, for the same condition. Two days after the latest operation, she experienced clear, yellowish discharge from her right ear, which was initially suspected as a chronic suppurative media otitis. A povidone-iodine test was conducted, with positive result obtained. No other symptoms nor signs were identified. A 14-days of total rest in recumbent position, antibiotic and acetazolamide administration was applied, with no improvements whatsoever. The patient then underwent re-craniotomy to close the defect, as well as continuous lumbar drainage placement. A defect was identified on the right mastoid bone, where bone wax was applied to seal the defect. The right ear discharge persisted after ten days of continuous lumbar drainage. It was decided that another craniotomy was necessary to close the defect, using autologous fat and fibrin glue to strengthen the closure. After the second operation, no CSF leakage was complained.