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Management of CSF Rhinorrhea: A Review

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ABSTRACT-Treating a Cerebrospinal fluid leak is exigent and contentious. Many authors have given their opinions regarding the management of CSF leak. Prophylactic antibiotics happened to minimise the risk of meningitis or local infections while the conservative management. Life threatening complications demands for surgical repair of CSFleak. But it is not always easy to locate the fistula and the end result of the direct surgical interventions is not victorious all the time .Various techniques and materials have proved to be effective at attaining closure of fistulas. Hence the goal of this article is to make a pooled analysis of the management procedures of CSF leak.

Keywords- CSF, CSF Rhinorrhea, CSF leak, CSF fistula, Spontaneous CSF leak

I. INTRODUCTION-

Galen was the first person to elucidate the concept of Cerebrospinal fluid rhinorrhea in the second century AD. He hypothesized that CSF was released into the nose through ethmoid and pituitary regions. The first group of patients who were detected with CSF leak was set forth by Saintclair in the year 1899. But the first successful repair of CSF rhinorrhea was put out by Dandy in 1926.Before World War I, CSF rhinorrhea was mostly thought to be of nontraumatic origin because the patients with the head injuries hardly put through long time enough to evolve as CSF rhinorrhea. It was after World War I, trauma became the chief cause of CSF rhinorrhoea.

The management of CSF rhinorrhea depends on the cause of CSF leak. CSF rhinorrhea can be categorised as Traumatic, Nontraumatic, Spontaneous and Iatrogenic. CSF leak due totraumatic causes can be further classified as planned surgical or unplanned surgical and nonsurgical.Accidental traumas accounts for 70% - 80% of cases of CSF rhinorrhea.CSF rhinorrhea cases reported due to acute head injuries accounts for 2%-4% .CSF rhinorrhea due to non traumatic reason includes high pressure CSF leak(45%) and normal pressure leaks.Normal pressure leaks happen due to fistulas, meningocephelocus, encephaloceles, empty sella syndromes, erosions due to tumors etc. Spontaneous CSF leaks have an idiopathic origin. Patients suffering from CSF rhinorrhea tend to complain about salty or even sweet taste as CSF contains about 2/3rd sugar content of blood. An acute or chronic leak may result in headache. On performing Valsalvas maneuver, the fluid leak differs from occasional drip to a gusher. Pressure type headache, pulsatile tinnitus, visual disturbances can be appreciated in patients with empty sella. On confirmation of persistent leak, localization of the leak is done with various appropriate diagnostic modalities, and surgical interventions are done if indicated due to the risk of further complications. Historically, intracranial (open) application have been used for Cerebrospinal fluid leak repair. Recently endoscopic approaches have been the likely way of approach with high win rates and decreased morbidity than authentic open intracranial approaches. Repair via Endoscopic techniques are great many including tissue grafts, vascularised flap, sealants, and various multilayered combination of methods.

II. DISCUSSION-

The main focus of conduct of cerebrospinal fluid escape is localisation of defect in the dura. This defect may spring from any part of the cranial fossae. Collective image studies happen to identify locations of defects of dura. The relevance of these studies depend on various factors such as population, size of the defect, interpretation by the operator, and flow rate of the leak. Multiple imaging studies include High-resolution coronal and axial CT, CT cisternograms, Radionuclide cisternograms, Intrathecal fluorescein, MRI and MR Cisternography.

CONSERVATIVE MANAGEMENT- CSF leaks takes over 7 to 10 days from trauma either accidental or surgical to heal conservatively. It takes number of days or few weeks after trauma, huge leaks or normal pressure cerebrospinal fluid leaks to develop as CSF rhinorrhoea. Cherry picked treatment includes bed rest and head raise (15-30degrees), refuse to any straining activity and the use of laxatives. Antibiotic prophylaxis is still contentious to reduce development of resistant

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organism. Antibiotic prophylaxis comes into role when a contamination is along a fluid pathway. A leak of CSF caused when there is an increase in the intracranial pressure will solve when intracranial pressure is almost normal. The use ofdiuretics helps decreasing the intracranial pressures. Leaks which are adamant on decreasingwhen the intracranial pressures gets normal are suggestive forsurgical procedure.

SURGICAL MANAGEMENT- There is a number of factors that are involved in surgical management. It includes use of drain (lumber), the path for repair of the leak, the kind of graft or flap it requires for along with the use of the grafts or flaps, and inflictionof sealant and anterior or posterior nasal packing.

LUMBAR DRAIN- The employ of a drain is still a controversial choice. It is also contentious about the use of a drain mostly, subarachnoid lumbar or consecutive lumbar punctures as lumbar drainage has been a risk. And over drainage may create a resultant pneumocephalus.There might an increase in the intracranial pressure on the use of the lumber drain, which warrants a risk of recurrence. Other issues include headache, nausea, vocal cord paralysis, vomiting, occlusion of the posterior cerebral artery, and lumbar radiculopathy.

SURGICAL APPROACHES-

TRANSCRANIAL APPROACH- A triumphant mend of a cerebrospinal leak using an open methodology was first done by Dandy 1929. And the success rate ranges from 60% to 95%. Superiority of this approach includes better uncovering, ability to recognise manifold flaw, and potential to block a discharge in a highly pressuredsituation.

EXTRACRANIAL APPROACH- First documentation was by Dohlman in the year 1948. Overall success rate has been noted as 97% and 86% on commencing surgical treatment. Reduced morbidity, no loss of smell, ameliorated endonasal exposure of the sinuses such as sphenoid, parasellar and posterior ethmoid, cribriform plate, and the posterior wall of the frontal sinus was seen. This procedure can be quite cumbersome and there is risk for facial deadness, and orbital complications.

TRANSNASAL APPROACH- Hirsch explained about this approach in 1952. Lehrer and Deutsch refined envision by microscope. It includes risks like numbness of face as well as septal perforation.

ENDOSCOPIC APPROACH-Wigand narrated closing down of a cerebrospinal fistula with the use of an endoscopic application in the year 1981. It has better rate of success and lesser rate of morbidness than surgical repair. Hence it is a preferred approach these days.

SEALANT- Fibrin is the mostly used sealant in this day which is an amalgamation of Fibrinogen, Thrombin, and Ca cofactor. This provides a non-permanent closure and fabricates an added roadblock to CSF leakage at the time of healing of wound and fibrosis.

PACKING-Packing materials includes absorbable and nonabsorbable. The type of material used for pack to be used is the surgeon's option.

FOLLOW UP-The possibilityof the normal sinus drainage to be blocked when repair of the defect is at the proximity of a sinus outflow tract. Postoperative follow-up to rule out occurrence of any retention cysts when thisperturb for blockage is done by proper CT scan.

III. CONCLUSION-

Advancement in imaging and endoscopic techniques have refined thepotentiality to identify, localize, and manageCSF leaks in least ghoulish way of the anterior skull base. The method of leakage and the correlation between cerebrospinal fluid production and immersion should be taken into note when individualizing a repair. Increased fluid pressure seeded by moreproduction or lessabsorption might give rise to tenacity of a leak despite complete management. Advancements in grafts (replacement of Dura) and sealants of tissues haveled to betterment of the performance for watertight closure of the vault.

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