



MANAGEMENT OF CEREBROSPINAL FLUID LEAK AFTER TRAUMA- A REVIEW

Dr.S.S .Shanjay^[1] Dr.Vijay Ebenezer^[2] , Dr.Balakrishnan Ramalingam^[3]

Postgraduate student, Department of Oral and Maxillofacial surgery, Sree Balaji Dental College and Hospital, Chennai

Professor and Head, Department of Oral and Maxillofacial Surgery, Sree Balaji Dental College and Hospital, Chennai

Professor, Department of Oral and Maxillofacial Surgery, Sree Balaji Dental College and Hospital, Chennai

ABSTRACT:-

Cerebrospinal fluid is a clear protein- glucose rich liquid in subarachnoid space of central nervous system. It is secreted by the ventricles surrounding the brain within central spinal column. It cushions the brain , maintains the buoyancy , retaining the shape shape , circulatory integrity despite its weight and lack of rigid support. Open communication of subarachnoid space with CSF leak, leads to meningitis. This article deals with the management of CSF CSF leak after trauma to maxillofacial region.

INTRODUCTION:-

CSF fistula also called as CSF leak is an uncommon but severe condition with potentially fatal outcome. It is classified as two types, namely:-

- i. Traumatic
- ii. Non-Traumatic

Traumatic is still classified as iatrogenic and non-iatrogenic.

Iatrogenic is due to nasal, endoscopic sinus surgery or cranial surgery further divided into accidental or imperfect reconstruction. At extensive pneumatization, patients are at risk! Anterior skull base fractures are frequently associated with moderate and high velocity impact. Rarely, injury and disruption to the orbit can result in CSF occulorhea^[1]. Spinal CSF leaks may occur after certain procedures like lumbar punctures, epidural anesthesia and spinal surgery.

Non iatrogenic is due to blunt or penetrating trauma^[2]. Male predominance is seen between 3rd and 5th decades respectively. This injury is rare in children due to elasticity of cranial bones.

Non traumatic due to high pressure and low pressure.

Diagnosis is difficult. Spontaneous leaks are complex to identify. It comprises of all leaks without recognized causal mechanisms and associated with meningeal herniation occasionally.

ETIOLOGY :-

A CSF leak occur when there is an open communication between subarachnoid and other spaces via meningeal disruption. The most common cause is due to the craniofacial trauma , accounting for 80% leaks. 16 % leaks are due to iatrogenic cause and remaining 4% due to varied etiologies like congenital defects^[1]. The cribriform plate, ethmoid bone, frontal and sphenoid sinuses are thin and closely associated with dura. Rarely injury and disruption to the orbit can result in CSF occluorrhea. Neurosurgical intervention can contribute to iatrogenic leaks with the prevalence endoscopic trans-nasal pituitary surgeries^[1].

TIMING OF CSF LEAKAGE:-

Timing of CSF leakage is important as it affects the long term prognosis with other complications.

EARLY ONSET:-

It includes the CSF leak within 48 hours from trauma^[3]. However in case of large bone or dura defect, medical disease like diabetes mellitus, CSF leakage have a high possible of fail.

DEALYED ONSET:-

This group of patients have CSF leak 1 week after trauma. Delayed CSF leak is present, even though the leakage is healed. The reasons are disappearance of blood clot and separation of dura and arachnoid by cerebral edema, subsides.

VERY LATE ONSET:-

It occurs after considerable amount of time, even before CSF leakage occur as in rhinorrhea^[3], as infection occurs. This is due to the shrinkage of brain as in old age. The CSF leaking site has a barrier , which can't work as infection barrier is considered.

DIAGNOSIS:-

The most clinical symptom is the leakage of clear or watery discharge from the nose and ear with positional dependency. Patient complaints of salty postnasal drip. It is clear and non- mucoid from nose and ear , and can be tested for double ring or halo sign on a filter paper. Patient might have ear fullness or loss of hearing. Due to the leakage, patient complaints of headache. Early detection helps to prevent from bacterial meningitis an intracranial abscess formation.

IDENTIFICATION OF CSF LEAKAGE:-

TARGET SIGN: If CSF is mixed with blood or nasal discharge, the CSF moves away from filter paper and blood moves close to filter paper, two rings visible.

HANDKERCHEIF TEST:-

When the discharge from the nose is buried in handkerchief or dry gauze, the CSF is clear, if not sticky. This is used to determine the nasal discharge due to mucin secretion.

β 2 TRANSFERRIN:-

β1 is found in serum tears, saliva and nasal secretion. Whereas, β2 is found in CSF, perilymph and vitreous humor. This test is highly sensitive and specific^[3].

MANAGEMENT OF CSF LEAK:-

CSF leak can be managed according to the etiology^[1]. This should be taken in caution, as it contributes to 29% meningitis. To lower intracranial pressure, drugs like acetazolamide, use of lumbar shunts is recommended. In case of high ICP, ventriculoperitoneal shunts are used to lower it, but has high complication rates.

Most of the CSF leaks spontaneously close within 7-10 days^[4]. If present beyond 7 days, it leads to meningitis. Risk of meningitis is 2.5%-10% with and without prophylactic antibiotics. Antibiotics recommended are ceftriaxone & ampicillin or sulfadiazine.

Conservative management includes patients with linear fractures on facial bone. Head end elevation should be 30 degrees and coughing, excessive yawning are restricted^[3]. Patient should be observed for 3 days clinically until further treatment is required. In case of CSF rhinorrhea, endoscopic intranasal management is preferred method^[4].

Surgical management is preferred and is classified into two types , namely, early and delayed.

Early management is done when , there is penetrating injury, intracranial hematoma, meningitis, large intracranial aerocele.

Delayed surgery is done, when, persistent CSF leakage is present after 10 days, delayed CSF leakage , recurrent aeroceles after 10 days. Surgical management is classified into intracranial and extracranial approach, of which extracranial approach is preferred^[3].

CONCLUSION:-

CSF leaks remain a challenging issue which requires new techniques for early diagnosis and management^[2]. Dynamic multidisciplinary approaches , applying newer techniques to diagnose and treat and following up of patients. The procedure can be made successful, if there is a team of neurosurgeon, otolaryngologists, ophthalmologists to evaluate CSF leak from first visit till follow up^[2].

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