

Original Research Article

Management and outcome of post-traumatic cerebrospinal fluid rhinorrhea

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ABSTRACT

Background: Post-traumatic cerebrospinal fluid (CSF) rhinorrhea are relatively uncommon neurosurgical condition that is associated with serious morbidity and life-threatening complications like meningitis. As such, it requires prompt and thorough evaluation and treatment. Is of note that, only few studies discussed CSF rhinorrhea in literature especially in sub-Saharan Africa. This study was designed to report outcomes of management of post-traumatic CSF rhinorrhea seen in our institution.

Methods: Relevant data of all patients with post-traumatic CSF rhinorrhea managed from July 2015 to June 2019 were retrospectively reviewed.

Results: Out of the total 1942 cases of head injury managed over the study period 20 cases (1%) were diagnosed with CSF rhinorrhea. The mean age of presentation was 30.5 years. All patients were male and road traffic accidents was the only aetiological factor noted. Majority of patients developed rhinorrhea after 48 hours of injury (12/20). Pneumocephalus was the commonest computerised tomographic scan finding and about 2/3rd of the patients required operative treatment by transcranial anterior cranial fossa repair (13/20). The remaining patients were managed non-operatively with acetazolamide, antihistamines, stool softeners and antibiotics. The outcome was generally good with no recurrence noted. The rate of mortality was 10% (2/20) and resulted from meningitis.

Conclusions: Posttraumatic CSF rhinorrhea was seen in 1% of cases of head injury in our environment and affects males predominantly. Although, the outcome of treatments was good, 10% mortality caused by meningitis was recorded.

Keywords: CSF rhinorrhea, Management, Outcome

INTRODUCTION

Cerebrospinal fluid (CSF) rhinorrhea is seen when there is a communication between subarachnoid space and the Sino nasal mucosa following bony and meningeal defects in the skull base leading to drainage of cerebrospinal fluid from the nose. Cerebrospinal fluid leaks are uncommon but are associated with lethal conditions such as meningitis, pneumocephalus or brain abscess.¹⁻³

Cerebrospinal rhinorrhea may be caused by trauma, cranial base tumour, congenital skull base malformation or may have unknown aetiology.^{1,4,5} Eighty percent of CSF leak results from non-surgical causes, 16% from surgical intervention and 4 % are non-traumatic.^{6,7} CSF leak has been reported to complicates two percent of head injury and 12-30% of fracture of the base of the skull.⁸ Ommaya in 1960, divides CSF leaks into traumatic or non-traumatic in origin.⁹ Traumatic causes can be further

categorised into surgical or non-surgical.⁴ Cairns also, classified CSF rhinorrhea into 4 classes: acute traumatic, delayed posttraumatic, operative and spontaneous.¹⁰ Unilateral CSF rhinorrhea remains the most common presentation of CSF leaks and more than half of traumatic leaks are obvious clinically within the first 48 hours and almost all are evident in the first three months of traumatic event.¹¹ Anterior skull base leaks are more frequent than middle or posterior leaks because of the tight adherence of the dura to anterior skull base.^{12,13} Temporal bone fracture with associated CSF leak may present with CSF rhinorrhea via drainage through eustachian tube in the presence of an intact tympanic membrane.⁶

Majority of posttraumatic CSF leaks may resolve spontaneously within the first two days of injury.^{14,15} The cranial computerised tomographic scan has become the most popular imaging modality in the evaluation of CSF leaks.^{16,17} The management of CSF rhinorrhea ranges from simple non-operative measures such as bed rest, use of stool softeners, diuretics, avoidance of straining, retching and nose blowing, use of lumbar drain, to more complex surgical operations.^{6,18,19} Prophylactic antibiotic therapy has not been shown to reduce risk of infections but may increase the chance of developing resistance.²⁰

Prompt and adequate evaluation of CSF rhinorrhea is much needed to avoid severe complications like meningitis which is reported to occur at about 10% yearly to up to 40% in long term follow up.²¹ Dandy in 1926 was credited with the first successful intracranial repair of CSF leak.¹⁸ Surgical approaches of CSF rhinorrhea repair include craniotomy-based intracranial techniques (both intradural and extradural) as well as less invasive endoscopic transnasal approach.¹⁸

The traditional Intracranial repair by craniotomy has cure rate of 70-80%, while other Authors reported recurrence of 40%.^{22,23} The craniotomy-based repair allows direct visualisation of the dural breach as well as proper treatment of complex bone fracture and use of pericranial flaps for optimum repair.²³ However, as against endoscopic transnasal it's associated with more complications such as anosmia, brain retraction, haemorrhage and cerebral edema.¹⁸

There were few studies in the literature discussing the outcome of management of post-traumatic CSF rhinorrhea in Africa, therefore, the study was designed to report outcomes of management of post-traumatic CSF rhinorrhea seen in our institution.

METHODS

Inclusion criteria

- Patients with diagnosis of Post-traumatic cerebrospinal rhinorrhea.

Exclusion criteria

- Patients with spontaneous CSF rhinorrhea and CSF leaks other than rhinorrhea.

Study population

Patients with head injury

Methodology

This was retrospective study involving patients with post-traumatic CSF rhinorrhea managed from July 2015 to June 2019. Relevant data such as clinical presentations, imaging findings, treatment offered, outcomes of management and number of cases of head injury seen over the aforementioned period were noted. A descriptive statistical analysis was done and results presented in frequencies and percentages.

RESULTS

Out of the total 1942 cases of head injury managed over the study period, 20 cases (1%) were diagnosed with CSF rhinorrhea. The mean age of presentation was 30.5 years. All patients were male and road traffic accidents was the only aetiological factor noted.

Eight patients (38.6%) developed rhinorrhea within 48 hours of injury (8/20). While remaining cases of CSF rhinorrhea was noticed after 48 hours. None had rhinorrhea beyond 1 week of trauma.

Pneumocephalus (Figure 2) was the commonest computerised tomographic scan finding and about 2/3rd (Figure 1) of the patients required operative treatment by transcranial anterior cranial fossa repair (13/20). The remaining patients (Figure 1) were managed non-operatively with Acetazolamide, antihistamines and stool softeners and avoidance of any form of Valsalva manoeuvre.

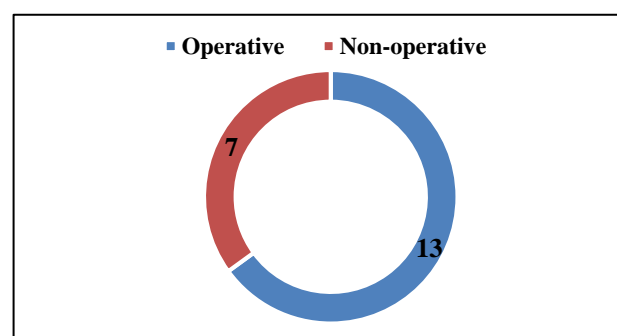


Figure 1: Distribution based on treatment option offered.

The outcome was good with no recurrence noted. The rate of mortality was 10% (2/20) and resulted from meningitis.

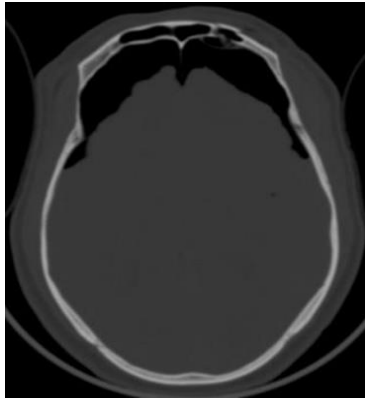


Figure 2: Axial cut of a patient with pneumocephalus and left frontal sinus fracture.

DISCUSSION

This is retrospective analysis of cases of post-traumatic CSF rhinorrhea managed over four-year period. As reported in other studies CSF rhinorrhea is a relatively uncommon condition that may complicate head injury, accounting for about 1% of head injury in our centre.^{19,24} Post-traumatic CSF rhinorrhea like other forms of head injury commonly affects young male individuals which was in keeping with the index study.^{25,26} Majority of cases of CSF rhinorrhea were reported to become clinically evident within the first three months of head trauma. This further corroborates the findings of the present series.²⁷

Numerous options of management of CSF rhinorrhea were described: non-operative measures such as bed rest, acetazolamide, anti-histamines, avoidance of valsalva manoeuvre, operative repairs: transcranial versus transnasal endoscopic.⁶ About two-third of our patients had operative intervention by bifrontal craniotomy, cranialisation of frontal sinus and closure of dural defect using a pericranial pedicled flap. None of the patients had transnasal endoscopic repairs. The remaining one-third had successful non-operative treatment. Though the outcome of both nonoperative and operative management was good, 10% mortality resulting from meningitis was recorded in our study. This is equivalent to the data of the previous studies.^{28,29}

CONCLUSION

Posttraumatic CSF rhinorrhea was seen in 1% of cases of head injury in our environment and affects males predominantly. Although, the outcome of treatments was good, 10% mortality arising from meningitis was recorded.

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