

ORIGINAL ARTICLE

Assessment of cases of CSF rhinorrhea among study group- A clinical study

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ABSTRACT:

Background: Cerebrospinal fluid (CSF) leak occurs due to abnormal communication between the subarachnoid space and a pneumatized area. The present study was conducted to determine cases of CSF rhinorrhea among study group. **Materials & Methods:** The present study was conducted on 104 patients of CSF rhinorrhea of both genders. Clinical features were recorded. Site of leak, causes of leak and management was also recorded. **Results:** The main cause of CSF leak was spontaneous in 55, trauma in 24, iatrogenic in 16 and congenital in 9 cases. Common site of CSF leakage was cribriform plate in 42, sphenoid sinus in 30, frontal sinus in 3, ethmoid sinus in 11 and multiple sites in 18 cases. The difference was significant (P< 0.05). Clinical presentation was nasal discharge in 85 cases, meningitis in 12, headache in 20, fever in 34, altered sensorium in 5 and hemocephalus in 6 cases. The difference was significant (P< 0.05). **Conclusion:** Authors found that most common site was main cause of CSF leak was spontaneous, trauma, iatrogenic and congenital. Common site of CSF leakage was cribriform plate, sphenoid sinus, frontal sinus, ethmoid sinus and multiple sites.

Key words: CSF leakage, Ethmoid sinus, Sphenoid sinus.

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INTRODUCTION

Cerebrospinal fluid (CSF) leak occurs due to abnormal communication between the subarachnoid space and a pneumatized area in the skull base that includes the sinonasal tract. This communication or fistula must involve a breach of the arachnoid and dura matter, the bone of skull base, and the underlying mucosa.¹ The surgical techniques differ based on the site of the defect. For defects involving the medial cribriform plate the defect was approached without sacrificing the middle turbinate and defects of lateral cribriform plate required the removal of middle turbinate and anterior and posterior ethmoidectomy and frontal sinus surgery.² The lateral recess of sphenoid sinus was approached via posterior wall of maxillary sinus leading through the pterygopalatine fossa and pterygoid plates into the lateral recess of sphenoid. Small defects were repaired with free grafts and fat and tissue glue. Moderate size defects were repaired with fat plug, cartilage, free grafts and tissue glue.³ The risk of developing meningitis after CSF rhinorrhea may vary from 5.6 to 60%. Hence surgical management of CSF rhinorrhea is highly recommended. Transnasal endoscopic approach first described by Wigand in 1981, has been confirmed to be the

approach of alternative in evaluation to intracranial and external nasal approach in most cases.⁴

Fluid leakage may be expressed by several symptoms and/or signs, although rhinorrhea is the most frequent one. In addition, presence of SF may be a risky condition for patient and onset of infections in the central nervous system, such as meningitis. Thus, in the absence of spontaneous resolution, a corrective procedure should be performed.⁵ The present study was conducted to determine cases of CSF rhinorrhea among study group.

MATERIALS & METHODS

The present study was conducted in the department of ENT. It comprised of 104 patients of CSF rhinorrhea of both genders. The diagnosis was made with CT & cisternography. All patients were informed regarding the study and written consent was obtained. Ethical approval was obtained from institute prior to the study.

Data such as name, age, gender etc. was recorded. A thorough examination was performed in all subjects. Clinical features were recorded. Site of leak, causes of leak and management was also recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 104		
Gender	Boys	Girls
Number	60	44

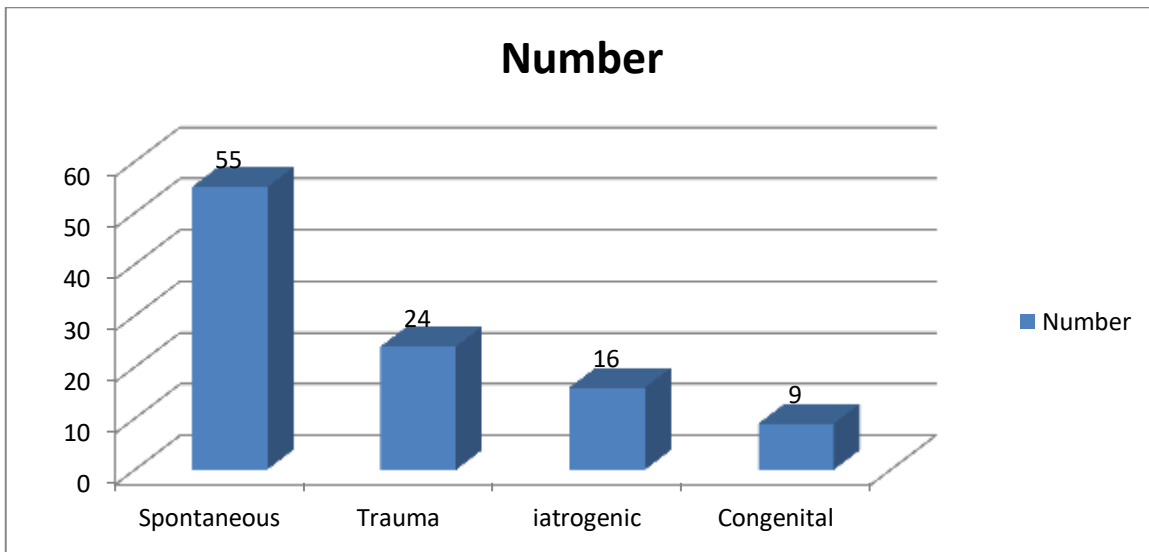
Table I shows that out of 104 patients, males were 60 and female were 44.

Table II Cause of CSF leak

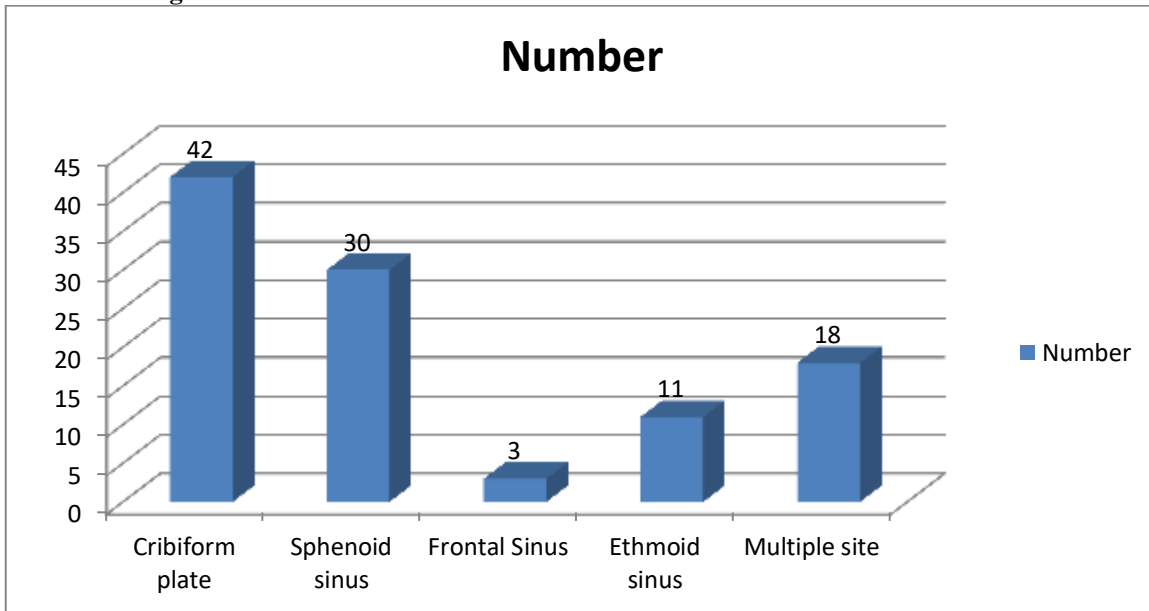
Cause	Number	P value
Spontaneous	55	0.01
Trauma	24	
iatrogenic	16	
Congenital	9	

Table II, graph I shows that main cause of CSF leak was spontaneous in 55, trauma in 24, iatrogenic in 16 and congenital in 9 cases. The difference was significant ($P < 0.05$).

Graph I Cause of CSF leak



Graph II Site of leakage of CSF



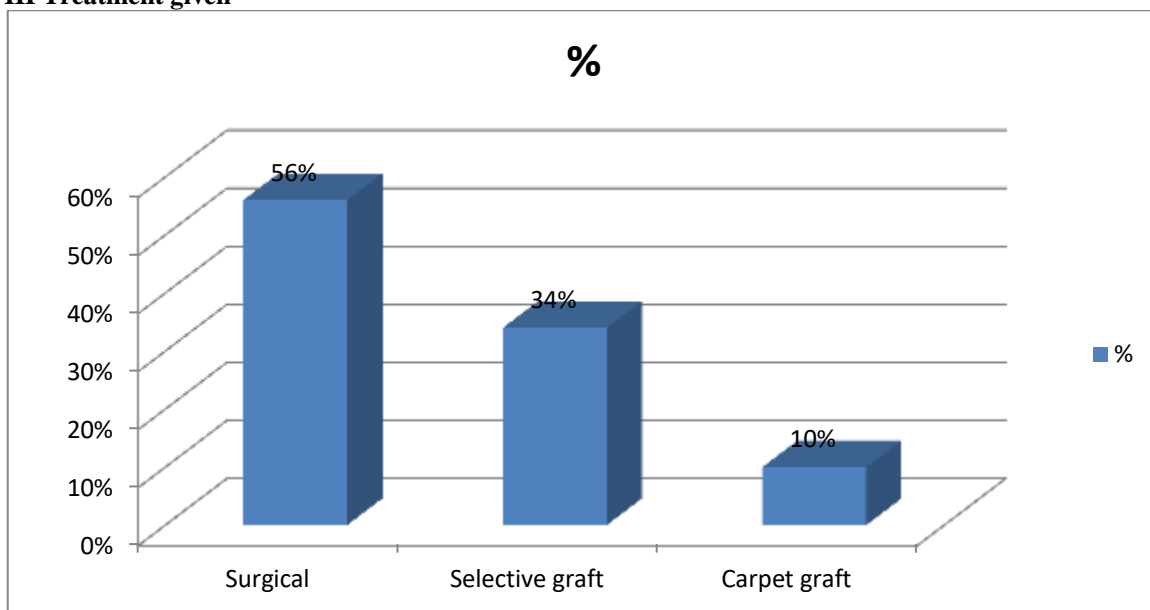
Graph II shows that common site of CSF leakage was cribriform plate in 42, sphenoid sinus in 30, frontal sinus in 3, ethmoid sinus in 11 and multiple sites in 18 cases. The difference was significant ($P < 0.05$).

Table III Clinical presentation in CSF leakage

Presentation	Number	P value
Nasal discharge	85	0.01
Meningitis	12	
Headache	20	
Fever	34	
Altered sensorium	5	
Hemocephalus	6	

Table III shows that clinical presentation was nasal discharge in 85 cases, meningitis in 12, headache in 20, fever in 34, altered sensorium in 5 and hemocephalus in 6 cases. The difference was significant ($P < 0.05$).

Graph III Treatment given



Graph III shows that 56% cases were managed surgically, in 34% cases selective graft and in 10% cases carpet grafts were used.

DISCUSSION

There are several classification for CSF rhinorrhea. It can be classified based on etiology as traumatic and non-traumatic.⁶ Traumatic fistulae are further divided into accidental, which contribute to 80% and iatrogenic or post-surgical to 16%. The non-traumatic or primary CSF fistula accounts for < 4% of all CSF fistulae. The non traumatic CSF fistula can be further divided into high pressure or normal pressure.⁷ Complications of CSF rhinorrhea are meningitis, brain abscess and pneumocephalus. Due to this prompt management and repair of all CSF rhinorrhea cases is the need of the hour.⁸ The present study was conducted to determine cases of CSF rhinorrhea among study group. In this study, we included 104 cases, of which males were 60 and females were 44. The main cause of CSF leak in our patients was spontaneous in 55, trauma in 24, iatrogenic in

16 and congenital in 9 cases. Deenadayal et al⁹ found that 7 patients were diagnosed with spontaneous CSF rhinorrhea. 5 of the 7 patients were obese, middle aged females managed with Transnasal endoscopic repair with fascia lata auto graft. Successful repair of CSF rhinorrhea was obtained in all the patients with a single endoscopic procedure. Spontaneous CSF rhinorrhea is a rare condition seen mostly in middle aged obese females with the anterior part of the cribriform plate being the most common site of leak. HRCT paranasal sinus was an efficient modality of investigation with ancillary investigations been CT Cisternography, CSF analysis and MRI for inactive leaks. In the absence of a large breach of the skull base, endoscopic repair of CSF rhinorrhea carries a high success rate with a high safety margin and very low morbidity rate.

We found that common site of CSF leakage was cribriform plate in 42, sphenoid sinus in 30, frontal sinus in 3, ethmoid sinus in 11 and multiple sites in 18 cases. Shah et al¹⁰ assessed the different sites and techniques of surgical repair and have certain recommendations to improve the surgical outcome. The commonest cause of CSF leak was spontaneous in 54.32% and the commonest site was cribriform plate in 43.24%. Patients presented most commonly with watery nasal discharge in 82.3% of cases. CT scan with cisternography or MR cisternography is the gold standard to identify the suspected site of leak. Out of 243 patients, 77.77% were operated using free grafts and 22.22% by flap repair.

Different approaches have been described for the repair of sinonasal CSF fistula, including the intracranial approach which has a high failure rate (up to 70%). Multiple extra cranial approaches have been used for repair of CSF leak.¹¹ We found that clinical presentation was nasal discharge in 85 cases, meningitis in 12, headache in 20, fever in 34, altered sensorium in 5 and hemocephalus in 6 cases. We found that 56% cases were managed surgically, in 34% cases selective graft and in 10% cases carpet grafts were used.

Araujo et al¹² included forty-four patients, 16 women (36%) and twenty-eight men (64%). Patients' ages ranged from 2 to 68 years (mean: 40.3 years). The most frequent site of fistulas was the ethmoidal cribriform area. Meningoencephalocele was the most prevalent cause of fistula. "Underlay" technique was used in 4 cases (9%), while "onlay" was performed in 40 cases (91%) "Onlay" technique was used in the patients who were also undergoing "underlay" technique. Surgical was used to fill the sphenoid sinus when SF was detected.

CONCLUSION

Authors found that most common site was main cause of CSF leak was spontaneous, trauma, iatrogenic and congenital. Common site of CSF leakage was cribriform plate, sphenoid sinus, frontal sinus, ethmoid sinus and multiple sites.

REFERENCES

1. Dodson EE, Gross CW, Swerdloff JL et al. Transnasal endoscopic repair of cerebrospinal fluid rhinorrhea and skull base defects: a review of 21 cases. *Otorhinolaryngol Head Neck Surg* 1994; 111:600–605.
2. Lanza DC, O'Brien DA, Kennedy DW. Endoscopic repair of cerebrospinal fluid fistulae and encephaloceles. *Laryngoscope* 1996; 106:1119–1125.
3. Burns JA, Dodson EE, Gross CW. Transnasal endoscopic repair of craniofacial fistulae: a refined technique with long term followup. *Laryngoscope* 1996; 106:1080–1083.
4. Gjuric M, Goede U, Keimer H, Wigand ME. Endonasal endoscopic closure of cerebrospinal fluid fistulas at the anterior cranial base. *Ann Otol Rhinol Laryngol* 1996; 105:620–623.
5. Vrabec DP, Hallberg OE. Cerebrospinal fluid rhinorrhoea by endonasal surgery. *Arch Otolaryngol* 1964; 80: 218-29.
6. Nachtigal D, Frenkiel S, Mohr G. Endoscopic repair of cerebrospinal fluid rhinorrhea: Is it the treatment of choice. *The journal of Otolaryngology* 1999; 28 (3): 129-33.
7. Hao SP. Transnasal endoscopic repair of cerebrospinal fluid rhinorrhoea: an interposition technique. *Laryngoscope* 1996; 106: 501-3.
8. Choi D, Span R. Traumatic cerebral spinal fluid leakage: risks factors and the use of prophylactic antibiotics. *Br J of Neurosurgery* 1996; 10: 571-5.
9. Deenadayal DS, Vidyasagar D, Kumar MN, Sudhakshin P, Chandra SS, Hameed S. Spontaneous CSF rhinorrhea our experience. *Indian Journal of Otolaryngology and Head & Neck Surgery*. 2013 Aug 1;65(2):271-5.
10. Shah N, Rao M. Analysis of Various Factors and Techniques to Improve Outcome of Surgical Management of 243 Cases of CSF Rhinorrhea. *Indian Journal of Otolaryngology and Head & Neck Surgery*. 2015 Jun 1;71(2):201-5.
11. Schick B, Ibing R, Brors D, Draf W. Long-term study of endonasal duraplasty and review of the literature. *Ann Otol Rhinol Laryngol* 2001; 110: 142-7.
12. Araujo Filho BC, Butugan O, de Melo Pádua FG, Voegels RL. Endoscopic repair of CSF rhinorrhea: experience of 44 cases. *Brazilian journal of otorhinolaryngology*. 2005 Jul 1;71(4):472-6.