

TRAUMATIC CSF OTORRHOEA WITH SPONTANEOUS CLOSURE- A CASE REPORT AND LITERATURE REVIEW

SUMMARY

We present a 40 year-old male teacher who was admitted via the accident and emergency unit of the hospital on account of bleeding from the left ear following injury sustained from road traffic accident about 10hours prior to presentation. sustained a head injury with left cerebrospinal fluid otorrhoea . Plain radiograph revealed wavy lucencies over the temporoparietal region with soft tissue swelling and a defect in the temporal bone extending in to the tympanomastoid area. Patient was managed conservatively with closure of the fistula and resolution of the leakage within 8 days after injury. We report this to further emphasis the role of conservative management in CSF fistula.

INTRODUCTION

CSF rhinorrhoea and/or otorrhoea present a common management problem for the surgeon involved in the care of cranio-facial trauma. Its recognition in patients with severe head injury is essential because as an early symptom it allows diagnosis of fractured base of the skull, sometimes even better than neuroradiological methods ¹ and in view of the possibility of fistula formation and meningitis^{2,3}. Yet there is hardly any information in the literature on this subject from Nigeria and the subregion. Current endoscopic techniques combined with intrathecal fluorescein dye enable most of these often difficult to diagnose, CSF leakage to be located and sealed with minimal morbidity ²⁻⁴. Unfortunately, these techniques are not available to the vast majority of centres and personnel involved in the management of head injury in our environment. Valtonen Het al⁵ reported 5 cases of spontaneous CSF otorrhea with tegmental defect and recommend B2-transferrin testing and combined mastoid and middle fossa approach for repair. Traumatic CSF fistulae have been described since the middle ages.

Keywords:-CSF Fistula,Trauma,Otorrhoea,Endoscopy,TM Perforation

34 CASE REPORT

35 A 40year-old teacher who was admitted via the accident and emergency unit of the
36 hospital on account of bleeding from the left ear following injury sustained from road
37 traffic accident about 10hours prior to presentation.

38 Patient was apparently well until about 10 hours prior to presentation when he was hit
39 from the backside by a fast moving motorcycle. He subsequently hit the face on a tarred
40 road resulting in bruises to the face with bleeding from the left ear and the nostrils.

41 Though, bleeding from the nostrils has stopped prior to arrival in our centre,there was
42 persistence of bleeding from the left ear. No history suggestive of ear discharge prior to
43 the incidence, no hearing loss. There was history of loss of consciousness which patient
44 regained at a private hospital where initial first aid was administered.No bleeding from
45 contralateral ear. Also, patient had an episode of hematemesis at the referral centre.

46 On examination, he was found to be restless but conscious with GCS of 14/15. He was
47 pale ,afebrile, anicteric,acyanosed and not dehydrated.

48 Vital signs : Pulse rate:90bpm. Blood Pressure:100/70mmHg.Respiratory rate :
49 24cpm.Temperature : 36.4⁰centigrade.SPO₂: 96%

50 The head and neck examination reavealed multiple bruises on the face,laceration on the
51 left epicanthus,periorbital ecchymosis and conjuctival haemorrhage.Also there was
52 swelling on the left temporoparietal region with nuchal rigidity.

53 Examination of the ear showed normal appearance of the pinna bilaterally. The left
54 external auditory canal was filled with bloody effluent trickling to the concha. No tragal
55 tenderness but there was fullness over the preauricular region. Endoscopic Otoscopy
56 revealed bloody otorrhoea continued, which later turned to clear,colourless fluid with
57 Perforated tympanic membrane[Fig 1]

58

59 Nasal cavity has normal pyramidal shape with no septal deviation.The nasal cavity was
60 filled with clotted blood debries ,the inferior turbinates were engorged, patency slightly
61 demonstrable bilaterally.

62 Oral cavity oropharyngeal examination shows mild trismus,tongue stained with altered
63 blood,mobile in all directions,posterior pharyngeal wall could not be fully assessed.

64 Patient was placed in 30 degree head up position with rigid cervical collar. Intranasal
65 Oxygen was administered. Blood samples taken for urgent PCV with electrolyte Urea
66 and creatinine. PCV result was 17% necessitating blood transfusion.

67 Cranial CT scan with bone window also requested for but due to financial reasons it was
68 not done however, plain radiograph done revealed wavy lucencies over the
69 temporoparietal region with soft tissue swelling.

70 Fig 1: Left Traumatic Tympanic Membrane Perforation



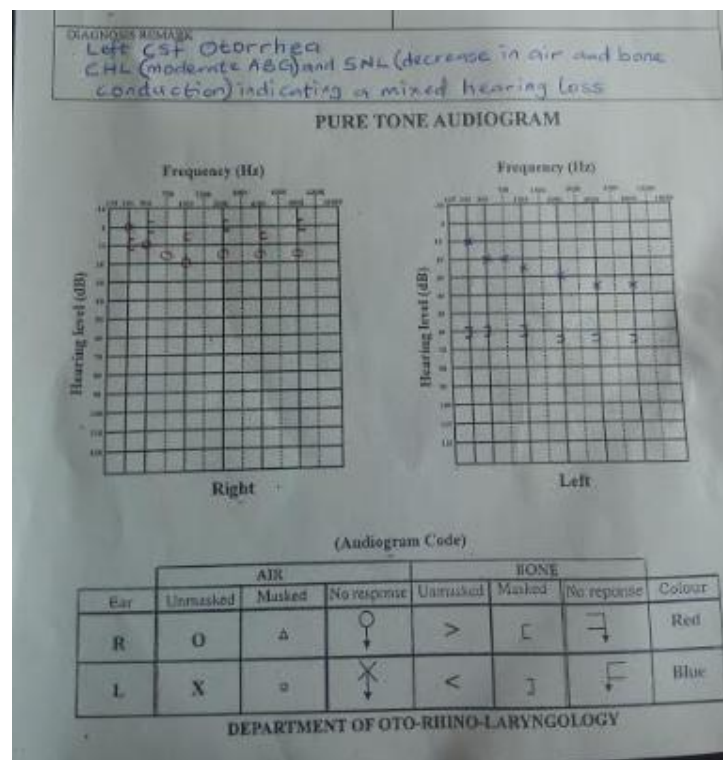
71

72

73 He was placed on intravenous antibiotics and analgesics. I.M tetanus toxoid and
74 Subcutaneous ATS were administered. Nasal decongestant was instilled 8hourly for
75 48hours . Patient was advised on the need to avoid excessive straining while coughing,
76 sneezing or defecating. The left ear effluent was allowed to drain out without any form
77 of packing or object inserted into the external auditory canal.

78 By the second day of admission GCS was 15/15.Patient was calmer and the rate of the
79 effluent from the left ear has reduced and much clearer. On the fourth day, the effluent
80 was almost clear and flow minimal as evidenced by its presence only within the canal.
81 When patient was reviewed on the seventh day the effluent has stopped completely.
82 PTA (Pure Tone Audiometry) revealed moderate mixed hearing loss.[Fig 2]

83 Fig 2:PTA Result-Left Mixied Hearing Loss



84

85 Patient was discharged to the clinic for subsequent follow up in satisfactory clinical
86 condition.

87 DISCUSSION

88 Rudolf and Jan W⁶ reported 4 cases of spontaneous CSF otorrhea repaired with
89 transmatoid and minicraniotomy approach. The commonest cause of CSF fistulae is
90 trauma to the skull base. Willis was reported to be the first to record instance of CSF
91 fistula in 1676⁷ and Walter Dandy was credited with the first successful repair of
92 traumatic dural laceration secondary to basilar skull fracture⁸. Leakage through an
93 enlarged labyrinthine facial nerve canal and enlarged geniculate fossa has been
94 reported⁹. The treatment may be conservative or surgical, the goal is repair of
95 meningeal tears and underlying bone defects¹⁰⁻¹³. Head trauma accounts for 50-80% of
96 all cases of CSF leak, and up to 16% are iatrogenic. CSF otorrhoea complicates 6% - 30%
97 of basilar skull fractures^{10,11}

98 Spontaneous CSF otorrhea is a rare condition and can be classified into two categories

99 according to age. In childhood it is due to congenital deformities of

100 labyrinths. Perilabyrinthine pathway of leak have been reported as widened fallopian canal.

101 Hyrtl's fissure and possibility of leak via the petromastoid canal along the subarcuate
102 artery⁷. Presentation is usually with recurrent attack of meningitis in hearing impaired child.
103 In adult, it is almost always due to a bony and dural defect mainly in tegmen tympani.
104 Different studies have been conducted which showed more than 20% bony dehiscence in
105 the tegmen in selected temporal bones^{8,9}. This is similar in what we found in our study and
106 in Lasisi et al study¹⁴. The pulsatile CSF pressure progressively drives the dura through the
107 defects and because of one way valve system and blocking action of brain tissue, the dura
108 cannot return back to normal position leading to progressive weakness and rupture of dura
109 leading to spontaneous CSF leak¹⁵.
110 Increased intracranial pressure, mastoiditis and age related dural weakness have been
111 postulated as contributing factors for CSF otorrhea¹⁶.
112 Diagnosis largely depends on suspicion especially in children. Identification of B2 -
113 transferrin in sampled fluid is currently biochemical investigation of choice with high
114 specificity^{17,18}. Intrathecal Fluorescein is the most accurate method of localizing site of
115 leak, however it is associated with complications like transverse myelitis and allergic
116 reactions¹⁹. Nuclear studies using radioisotopes e.g. iodine I131, radio iodinated serum
117 albumin (RISA), Ytterbium YB169 diethylenetriaminepenta acetic acid (DTPA), indium In 111
118 DTPA, technetium Tc 99m human serum albumin, and technetium Tc99 pertechnetate has
119 been documented. Despite relative safety, they have limitations with false positive results of
120 up to 33%^{7,19-22}. Digital subtraction cisternography is useful when the conventional methods
121 fail to identify the site of leak. Diagnostic yield may be improved by injection of metrizamide
122 or omnipaque²⁰⁻²³. MRI does not have added advantage over CT scan, since herniating brain
123 tissue is non-functioning and hence does not show features of normal brain tissue¹⁸. In this
124 case HRCT of temporal bone by using water soluble non ionic iodinated contrast medium

(omnipaque) showed a well defined defect in tegmentympany with soft tissue bulging representing encephalocele. But overall systematic application of any form of cisternography in the diagnostic workup of a spontaneous CSF leak is not advocated until needed²⁴. A positive B2-transferrin test justifies a surgical exploration, for the condition in life threatening and to reduce complications¹⁶. Traumatic or iotrogenic CSF leaks are known to have a higher inclination towards spontaneous healing. On the other hand, it has been shown repeatedly that spontaneous CSF leaks have a particular tendency to recur¹⁶. Meningitis has been reported in 25-50% of untreated traumatic CSF fistulas and in 10% of patients in the first week after trauma with head injury²³⁻²⁵. The use of antibiotic prophylaxis is controversial and not routinely indicated²⁴. Posttraumatic CSF fistulas persisting beyond 7 days, spontaneous CSF leaks with skull-base defects, increasing pneumocephalus, and meningitis are positive indications for surgical intervention²⁵⁻²⁶.

CONCLUSION

cerebrospinal fluid (CSF) leakage though the ear structures is not very common but potentially life-threatening situation that requires rapid intervention. This case presented has further reiterate that conservative management plays a role in its management.

Reference

1. Spangenberg P, Scherer R, Stolke D. Posttraumatic cerebrospinal rhinorrhoea. *Anesthesiol Intensive med Notfallmed Schmerzther* 1997; 32(2):105-108
2. Choi D and Spann R. Traumatic cerebrospinal fluid leakage: risk factors and the use of prophylactic antibiotics. *BrJNeurosurg*. 1996; 10(6): 571-575
3. Swift AC and Foy P. Advances in the management of CSF rhinorrhoea. *Hosp Moo*. 2002; 63(1): 28-32
4. Marshall AH, Jones NS and Robertson n. CSF rhinorrhoea: the place of endoscopic sinus surgery. *Br JNeurosurg*. 2001; 15(1): 8-12
5. Valtonen H, Geyer C, Tarlov E, Heilman C, Poe D. Tegmental defects and cerebrospinal fluidotorrhea. *Orl; Journal of Oto-Rhino-Laryngology and its related species* 2001; 63 (1) : 46-52.

159

160 6. Rudolf Kuhweide, Jan W. Casselman. Spontaneous cerebrospinal fluid otorrhea form a
161 tegmen defect: transmastoid repair with minicraniotomy. *Ann Otolrhinollaryngol* 1999;
162 108: 653-658.

163

164 7. Walter D. Pneumocephalus (Intracranial Pneumatocoles or arocele) *Archieve*
165 *ofSurgery*. 1926; **12**: 949-982.

166

167 8. Ignelzi RJ and Vander Ark GD. Analysis of the treatment of basilar skull fractures with
168 and without antibiotics. *Journal of Neurosurgery* 1975; **43**:721-726.

169

170 9. Chan DT, Poon WS, Chiu PW and Goh KY. How useful is glucose detection in diagnosing
171 cerebrospinal fluid leak? The rational use of CT and Beta -2 transferrin assay in
172 detection of cerebrospinal fluid fistula. *Asian Journal of Surgery*. 2004; **27**:39-42.

173

174 10. Buchanan RJ, Brant A, Marshall LF: Traumatic cerebrospinal fluid fistulas. In: Winn
175 HR, ed. *Youmans Neurological Surgery*. 5th ed. Philadelphia: W. B. Saunders Co; 2004:
176 pp5265-5272.

177

178 11. Lee KJ Highlights and Pearls. In: *Essential Otolaryngology Head & Neck Surgery*
179 8th Edition, McGraw – Hill medical Publishing Division USA, 2003. pp1015-1093.

180

181 12. Gacek RR, Leipzig B. Congenital cerebrospinal otorrhea. *Ann otolrhinollaryngol*
182 1979; **88**: 358-65.

183

184

185 13. Ignelzi RJ and Vander Ark GD. Analysis of the treatment of basilar skull fractures
186 with and without antibiotics. *Journal of Neurosurgery* 1975; **43**:721-726.

187

188 14. Akeem O. Lasidi, Mohammed A. Kodiya, David O. Udoh. Spontaneous closure of
189 traumatic CSF otorrhoea following conservative Management. *Afr J Health Sci*. 2006;
190 **13**:78-80]

191

192 15. Neely JG, Neblett CR, Rose JE. Diagnosis and treatment of spontaneous cerebrospinal
193 fluidotorrhea. *Laryngoscope*
194 1982; **92**:609-12.

195

196 16. FE Ologe and TO Odebode. Cerebrospinal fluid (CSF) rhinorrhoea and/or otorrhoea
197 in patients with head injury. *Afi: 1. Meel. Meel*. 5(1. (2005) **34**, 173-175.

198

199 17. Skedros DG, Cass SP, Hirsch BE, Kelly RH. B2 transferrin assay in clinical
200 management of cerebral spinal fluid and perilymphatic fluid leaks. *Journal of*
201 *otolaryngology* 1993; **22**(5) : 341-4.

202

- 203 18. McGuirt WF, Stool SE. Cerebrospinal fluid fistula: the identification and
204 management in pediatric temporal bone features. *Laryngoscope* 1995 ; 105 (4) : 359-
205 64.
206
- 207 19. Park JI, Strelzow VV and Friedman WH. Current management of cerebrospinal fluid
208 rhinorrhoea. *Laryngoscope*. 1983; **93**:1294-1300.
209
- 210 20. Petrus LV and LO WW. Spontaneous CSF otorrhea caused by abnormal development
211 of the facial nerve canal. *American Journal of Neuroradiology*. 1999; **20**:275-277.
212
- 213 21. Burton EM, Keith JW, Linden BE, Lazar RH: CSF fistula in a patient with Mondini
214 deformity: demonstration by CT cisternography. *American Journal*
215 *of Neuroradiology*. 1990; **11**:205-207.
216
- 217 22. May JS, Mikus JL, Matthews BL, et al: Spontaneous cerebrospinal fluid otorrhea from
218 defects of the temporal bone: a rare entity? *American Journal of Otolaryngology*. 1995; **16**:765-
219 771.
220
- 221 23. Mahaley MS Jr, Odom GL. Complications following intracranial injections of
222 fluorescein. *Journal of Neurosurgery*. 1966; **25**:298-299.
223
- 224 24. Gacek R R. Evaluation and management of temporal bone arachnoid granulation.
225 *Arch Otolaryngol Head and Neck surgery* 1992 : 118: 327-32.
226
- 227 25. Probst C. Neurosurgical treatment of traumatic frontobasal CSF fistulae in 300
228 patients. *Acta Neurochir (Wien)*. 1990; **106**:37-47.
229
- 230 26. Stankiewicz JA. Cerebrospinal fluid fistula and endoscopic sinus
231 surgery. *Laryngoscope* 1991; **101**:250-256.