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Cerebrospinal fluid (CSF) rhinorrhoea and/or otorrhoea in patients with head injury

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Summary

The essence of this study is to investigate the incidence, clinical profile and outcome of conservative treatment of cerebrospinal fluid rhinorrhoea and/or otorrhoea in head injured patients. Records of head injured patients between 1991 and 2000 at the University of Ilorin Teaching Hospital, Ilorin, Nigeria were retrieved and reviewed for demographic data, cause of head injury, incidence of CSF rhinorrhoea and/or otorrhoea and outcome of conservative management. Of the 794 patients, 39 (4.9%): 28 (71.8%) males and 11(28.2%) females presented with CSF rhinorrhoea and/or otorrhoea. Nineteen (48.7%) of them had rhinorrhoea, 13 (33.3%) otorrhea and 7 (18%) had both. They were aged 1 to 60 years with a mean age of 28.More than 40% of them were aged 10 years or less and about a quarter were in the fourth decade of life. The commonest cause of injury in these patients was road traffic accident, 27 (69.2%).About a quarter sustained their injuries as a result of fall from height. The mortality rate among patients with CSF rhinorrhoea and/or otorrhoea (33.3%) was higher than among the total population of the head injured (23%). All survivors had spontaneous cessation of CSF leakage within two weeks of head injury. In our centre, the incidence of CSF rhinorrhoea and/or otorrhoea following head injury is 4.9%. Though this complication of head injury was associated with increased mortality rate, it does not appear to be a prognostic factor in head injury ($P>0.05$).

Keywords: *Cerebrospinal fluid, rhinorrhoea, otorrhoea, head injury*

Résumé

Par investiguer l'incidence , le profile et le traitement conservatif de la rhinorrée du fluide cerébrospinale ou otorrhée sur les blessures de tête aux patients. Leurs registres au Centre Universitaire Hopitalier d'Ilorin entre 1999-2000 ont été rêvus. Sur 794 patients, 39(4.9%) ; 28(71.8%) males et 11(28.2%) femeles avaient la rhinorrhée du fluide cerébrospinale ; 13(33.3%) otorrhée et 7(18%) avaient les deux. Leur age variait entre 1 a 60 ans avec une moyenne d'age de 25 ans. Plus de 40% étaient moins de 10 ans et presque le quart était a leur 4ieme diziane de vie. L'accident de voiture était la cause plus commune(27.2%) et presque le quart des patients résultant de la tombée. Le taux de mortalité parmi ces patients était de 33.3% , plus élevé que la population totale des blessés de tete(23%). Les survivants avaient une cessation constante de perte de FCS dans 2 semaines de blessure. Dans ce centre, l'incidence de la rhinorrhée est aprés la blesure de la tête est de 4.9%. Bienque cette complication de la blessure(23%) était associée avec une augmentation du taux de mortalité.Ceci n'apprait pas etre un prognostique de la blessure de tête ($P>0.05$).

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. The aim of this study is to retrospectively investigate the incidence, clinical profile and outcome of conservative treatment of posttraumatic CSF rhinorrhoea and/or otorrhoea in our centre over a 10 year-period.

Materials and methods

The ten-year retrospective study was carried out in the University of Ilorin Teaching Hospital (UITH), Ilorin, Nigeria. The UITH is a major referral hospital in the middle belt of Nigeria, serving up to six neighbouring constituent states in the region. Until recently, the only major road link between the northern and southern parts of Nigeria runs through Ilorin and constitutes one of the major sites of frequent automobile accidents in the country.

For the major part of the period under consideration (1991-2000), general and orthopaedic surgeons handled neuro-traumatized patients conservatively. Only skull x-rays were done since there were no facilities for computer tomographic brain scan. CSF rhinorrhoea and/or otorrhoea were recognized by dripping of watery discharge from the nose and/or the ear, and confirmed by simple clinical tests, such as target sign in which CSF mixed

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Table 1: Age and sex distribution of patients with CSF rhinorrhoea and/or otorrhoea accompanying head injury.

Age (yrs)	Sex		Total CSF leak (n_1)	%	Total head injured (n_2)	n_1/n_2 %
	Male	Female				
1-10	10	6	16	41.0	242	6.6
11-20	3	1	4	10.3	153	2.6
21-30	2	1	3	7.7	128	2.3
31-40	8	2	10	25.6	124	8.1
41-50	4	1	5	12.8	84	6.0
51-60	1	-	1	2.6	30	3.3
61-70	-	-	-	-	18	-
71-80	-	-	-	-	13	-
>80	-	-	-	-	2	-
Total	28	11	39	100	794	4.9

with blood produces a "halo" effect and stiffening after staining a white bed cloth.

Records of all head injured patients within the period were retrieved and reviewed for demographic data, cause of head injury, clinical profile of CSF rhinorrhoea and/or otorrhoea as well as outcome of conservative management of the head injury .Patients with insufficient data were excluded from the study. A simple descriptive analysis was performed for the 794 head injured patients who fulfilled the study criteria.

Results:

Of the 794 patients, 39 (4.9%): 28 (71.8%) males and 11 (28.2%) females presented with CSF rhinorrhoea and/or otorrhoea. Nineteen (48.7%) presented with rhinorrhoea, 13 (33.3%) with otorrhoea and 7 (18%) with both. They were aged 1 to 60 years with a mean age of 28. More than 40% of these cases occurred in those aged 10 years or less and about a quarter in the fourth decade of life. However, the proportion of head injured patients with CSF leakage was highest during the fourth decade (8.1%), followed by those aged 10 years and below (6.6%) and absent in the elderly (>60years)(Table I).

Table 2: Causes of head injury in 39 patients with posttraumatic rhinorrhoe and/or otorrhoea

Mode of injury	Frequency %
Traffic related	27 (69.2%)
Fall from height	10 (25.7%)
Missile	2 (5.1%)
Total	39 (100%)

The most common cause of injury in these patients was road traffic accidents in 27 (69.2%) patients. These included 11 (40.7%) occupants, 11(40.7%) pedestrians and 5 (18.6%) cyclists. About a quarter sustained their injuries as a result of fall from height. (Table 2).

Table 3: Outcome of conservative management of head injury in 39 p[atients with posttraumatic rhinorrhoea and /or otorrhoea, using Glasgow outcome scoring (GOS) system

Outcome	Frequency (%) CSF leakage	No. head injured (%)
Good recovery	25 (64.1)	535 (67.4)
Moderate disability	1 (2.6)	18 (2.3)
Severe disability	-	24 (3.0)
Vegetative state	-	8 (1.0)
Death	13 (33.3)	183 (23.0)
Voluntary discharge	-	26 (3.3)
Total	39 (100)	794 (100)

The mortality rate was higher among head injured patients with CSF rhinorrhoea and/or otorrhoea (33.3%) than among those without (23%). Though this complication of head injury was associated with increased mortality rate, it does not appear to be a prognostic factor in head injury ($P>0.05$).

Table 4: Late ear, nose and throat complications in survivors (n = 611).

Complication	Frequency	Percentage
Hearing loss	12	2.0
Vertigo	4	0.6
Anosmia	2	0.3
Dysphagia	2	0.3
Tympanic membrane perforation	-	-

All survivors had spontaneous cessation of CSF leakage within 2 weeks of head injury. There was no report of cases of intracranial aerocele or fracture of the face (Le Forte types) in association with head injury among the study population (Table 3). In addition no patients mani-

fested neurological signs of meningitis. Otolaryngologic evaluation of survivors revealed hearing loss, vertigo, anosmia, and dysphagia in 12, 4, 2 and 2 subjects respectively (Table 4).

Discussion

CSF rhinorrhoea and/or otorrhoea are under diagnosed, difficult to locate and often clinically silent [3]. The incidence of this condition in our study population was 4.9%. This is comparable to the approximately 2-6% reported for head injured patients [1,5,6] elsewhere. The higher figures are associated with more severe injuries [1]. In patients with diagnosed petrous bone fractures, incidences of up to 15% have been reported [7,8] and more than 25% in the paediatric age group [9]. As confirmed by this study road traffic accident is the commonest cause [6]. Rhinorrhoea is usually commoner than otorrhoea. A report showed the former to be 2 to 3 times more frequent than the latter [7] probably because the cribriform plate and the sphenoid bone are more delicate than the petrous bone.

About two-thirds of our patients had spontaneous cessation of CSF leakage within two weeks of the head injury. This is consistent with the findings in other studies [10]. This figure also corresponds to the favourable outcome from head injury in our study population. Mortality rate among patients with CSF rhinorrhoea and/or otorrhoea was higher than overall mortality rate among the head injured. This may indicate that patients with CSF rhinorrhoea and/or otorrhoea may have suffered the more severe form of head trauma. But it also raises the possibility of inadequate care for this group of patients due to lack of facilities and appropriate personnel, during the period of study.

The more severe the head injury, the higher the level of care required and the less likely for a personnel without specific and specialized training in the field to adequately care for the patient.

The fact that no cases of meningitis were recorded could be because the more severe cases of CSF rhinorrhoea and\or otorrhoea did not survive for long enough to develop meningitis or allow it to be diagnosed. Reports state up to 2% incidence of meningitis in head injured patients [8]. The practice during the period of study was to uniformly administer prophylactic antibiotics to patients with moderate and severe head injury. This is useful in preventing the onset of meningitis. From the foregoing, it can be concluded that CSF rhinorrhoea and\or otorrhoea is a significant complication of head injury in our environment.

This work indicates that CSF leakage through the nose and ear can be managed conservatively in a centre where facilities for both otolaryngologic and neurosurgical services are lacking. However, where such facilities are available the neurosurgeon would be useful in dura repair for intractable CSF otorrhoea and /or rhinorrhoea while the otolaryngologist would better outline and manage ear, nose and throat complications such as anosmia, hearing loss, perforation of the tympanic membrane, osscicular disjunction, vertigo and other vestibular dysfunctions [11].

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