

REVIEW

Perilymphatic Fistula: An often Unrecognized Occupational Handicap? A Review of the Literature and Some Consequent Remarks

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Perilymphatic fistula is an abnormal communication between inner and middle ear, usually through the oval or the round window, with a leakage of perilymph in the middle ear. It can present with fluctuating and generally progressive hearing loss, frequently associated to dizziness and/or vertigo, aural fullness and tinnitus that can occur without a precise pattern. Despite the potential danger derived from the persistence of a perilymphatic fistula in some categories of workers, the necessity to protect potentially affected subjects is often underestimated: for this reason, a review of the literature seemed useful in order to assess the overall awareness of the problem and help avoiding the exposure of these subjects to uncontrolled risks.

Submitted : 12 March 2013

Revised : 27 June 2013

Accepted : 28 July 2013

Introduction

Perilymphatic fistula (PLF), that was first reported by Fee in 1968 ^[1], is represented by an abnormal communication between inner and middle ear, usually through the oval or the round window, with a leakage of perilymph in the middle ear and a consequent labyrinthine damage and increased risk of meningitis. It can present with a more or less fluctuating and generally progressive hearing loss, frequently associated to dizziness and/or vertigo, aural fullness and tinnitus that can occur without a precise pattern. In absence of a known otologic affection, the diagnosis of PLF is often challenging and an undetectable number of cases go undiagnosed ^[2], due to the unspecific

symptoms, their variable association and severity, the lack of general consensus about specific instrumental investigations and the frequent difficulty to find out a clear aetiology. Additionally, PLF may intermittently open and close thus varying the clinical and diagnostic picture ^[2]. As a matter of fact, both external and internal traumatic factors may be at the origin of this disease: among these, stapedectomy is classically considered ^[3] but even a blunt head injury, Valsalva manoeuvres, barotraumas, vigorous exercise ^[4], landing in an airplane, blowing the nose and lifting heavy goods ^[5] may represent a causal factor. Predisposing conditions help recognize PLF ^[5]; however, the instrumental tools only permit a diagnostic orientation ^[6] and the final

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diagnosis is usually possible only after an explorative tympanotomy^[7]: during this procedure, even if the fistula is not clearly recognized, it is possible to seal the windows thus achieving the repair of any supposed abnormal communication between inner and middle ear. On the other hand, the possibility of a spontaneous repair exists, and it partly can explain the diffuse scarce willingness to undergo a surgical procedure that could reveal itself as an overtreatment. Under these conditions, it is possible that many cases of vertigo and hearing disorders are hurriedly labelled as Meniere's Disease related^[8] or "idiopathic" and the prevalence of PLF is actually greater than expected. This could imply the possibility of fluctuating hearing loss and vertigo depending on everyday life changes in middle or inner ear pressure, which can be easily related to some of the trivial actions previously reported; consequently, a handicap could result whenever a stable bilateral serviceable hearing and especially a stable balance are required, involving lifestyle in general terms and, more specifically, amateurish and/or occupational abilities.

Despite the potential danger derived from the persistence of a PLF, the necessity to protect potentially affected subjects is often underestimated: for this reason, a review of the literature seemed useful in order to assess the overall awareness of this specific problem and eventually help avoiding the exposure of these subjects to uncontrolled risks.

Review of the literature

For this review a search in PubMed for articles published before March 2013 was performed using the keyword perilymphatic fistula associated with the following words: disability, workers, blue collars, diving, work, risk, incapacity, occupation, occupational limits, air flight, physical effort. In the same way, we also searched in PubMed using the keyword occupation linked to dizziness and vertigo. The same strings were used by consulting the All Databases service of ISI Web of Knowledge. Once we found an article that we considered suitable for our purposes we searched for other studies among the

related citations and, when the complete manuscript was available, among the list of references. We were forced to exclude the articles in case both the abstract and the full text were not available.

Dizziness is often complained for by workers of different categories, without association with PLF. Conversely, only sporadic remarks, mostly published in the '90s, cite both the possible occupational origin of this affection and the derived occupational limits, although the association between PLF and diving and barotraumas is well established^[9-12]. As concerns diving, an increased risk of middle ear barotraumas is reported in a recent overview, that anyway underlines that no statistically significant differences were found between divers and non-divers for hearing loss and tinnitus^[13]. Regarding other causes, a case of bilateral PLF without head trauma is documented in a construction worker, and referred to a physical effort^[14]. Another case, occurred to an ironworker who had a vertigo attack when lifting and lowering 200 pounds of steel and who could not continue work due to difficulty with balance even after grafting of the round window, is reported some years later^[15]; on the other hand, surgery is considered to permit the relief of vestibular symptoms in a large percentage but not in all cases^[2].

Concerning flight, restrictions are considered for aircrew who underwent stapedectomy^[3] although the matter is controversial^[16]. More recently, four cases of PLF observed during a period of six months in a major airline company employing about 3000 cabin attendants and primarily undiagnosed are reported: among these subjects, who had diagnosis at the Aviation Medical Centre, only one out of four was subsequently able to return to flying duties^[17]; moreover, due to the possible connection with flight in presence of a poor middle ear equalization, the necessity of remind to the crews to avoid flying with a common cold is emphasized^[17]. In the same years, a case of tinnitus in an active duty navy diver is reported^[18].

Finally, as regards recovery, a large survey sent to United States otolaryngologic centres in the '90s

shows that the length of postoperative disability especially regarding exposure to noise, travel by airplane, swimming and heavy lifting is mostly rated at several weeks to several months^[19].

Comment

Despite the variety of causes that give rise to a PLF and the potential severity of its consequences, its incidence in occupational settings, especially when excluding people professionally exposed to barotraumas, remains poorly considered; moreover, the overall necessity of anamnestic deepening, additional clinical and instrumental examinations and caution for particular categories of workers is scarcely underlined. Conversely, the multiplicity of common, possibly subtle and underestimated events that can result in this phenomenon, associated with the possibility of an intermittent presentation of symptoms, should be clearly kept in mind before re-admitting to their task a number of potentially involved workers. In particular, with a history of unresolved episodes of vertigo and hearing loss^[20], an old trauma and a pre-existing hearing loss that aggravates^[21] may be considered with suspicion in addition to the most classical histories. This inference seems of some practical interest, e.g., when considering the documented lesser attention of blue collar workers to a symptom as unilateral sensorineural hearing loss^[22], that may in some instances be reliably linked to PLF.

On the other hand, the surgical repair through a relatively simple and safe operation, as previously reported, reaches a high rate of success^[2], and makes it possible to overcome the occupational limits consequent to a PLF in a large percentage of cases. Notwithstanding the cited diagnostic limits and the clinical uncertainties, the awareness of the possibility of a PLF and a closer attention to the follow-up when it can be suspected could result in a safer re-admittance to work for people with an unclear history of acute inner ear disease.

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