

Case Report Snorkeling and Jones tubes

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Summary

We report a case of tympanic membrane rupture during snorkeling in a 17-year-old young man who had previously undergone bilateral Jones tubes placed for epiphora. To our knowledge, this phenomenon has not been previously reported.

Introduction

Epiphora caused by canalicular occlusion stems from a variety of conditions, such as inflammation, congenital agenesis, or chemotherapy.¹ The standard treatment of severe canalicular obstruction involves a dacryocystorhinostomy (DCR) combined with placement of a Jones tube, creating a conduit from the tear lake to the nasal passages, circumventing the obstruction. The Jones tube is a permanent Pyrex glass tube implant that provides excellent capillary attraction, with low risk of blockage, and is relatively inert.¹ The Jones tube has been reported to preclude the Valsalva maneuver because of retrograde airflow through the tube.² This impedes the individual's ability to equalize middle ear pressure, thereby predisposing him to barotrauma, labyrinth fistulas, and rupture of the tympanic membranes.²

Case Report

A 17-year-old young man presented at Christchurch Hospital, New Zealand, with epiphora due to bilateral canalicular obstruction. This was a result of Steven-Johnson syndrome from sulphonamide treatment for bronchitis at age 5 months. Due to bothersome epiphora, the patient underwent bilateral external DCR with Jones tubes. Because of a deviated septum from previous rugby injuries, the patient underwent concurrent septoplasty. Following surgery, the right Jones tube worked well, but the left tube was displaced, resulting in recurrent granuloma formation. This was treated medically and surgically. The following year, the patient returned to our clinic with a traumatic perforation of the right tympanic membrane after snorkeling.

Increased ambient pressure on descent during snorkeling causes middle ear pain, which may be eased by equalization of the pressure through momentarily opening the Eustachian tube. There are many ways to achieve this, including swallowing or yawning. The Valsalva maneuver, which involves blowing forcefully against a closed mouth and pinched nose, is another method of equalizing pressure and relies on a burst of internal pressure to force the Eustachian tube open.

The patient had no prior history of Eustachian tube dysfunction, but he was unaware of his inability to perform the Valsalva maneuver because of retrograde air flow through the Jones tubes. According to the patient, the event occurred at a depth of 2 meters, during a descent. The increased pressure on the external side of the eardrum became bothersome. He descended farther, attempting to clear the problem spontaneously but felt a sudden-onset, severe pain in the right ear, followed by a "pop." The 2 mm perforation in his tympanic membrane eventually healed spontaneously, although with some loss of hearing. The patient was advised to learn non-Valsalva methods of clearing his ears before resuming snorkeling. These involved chewing, yawning, or swallowing to contract the tensor veli palatini muscle, thereby contributing to the Eustachian tube opening. The use of nasal decongestants or antihistamines, especially in rhinitis, also facilitates equalization of middle ear pressure.

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Discussion

The Jones tube, introduced in 1962, remains the standard treatment for canalicular obstruction. A 25-year review by Athanasiov et al showed that symptomatic success was achieved in >90% of cases,¹ although many patients required secondary interventions due to tube extrusion, malpositioning, infection, granuloma formation, or obstruction. With retrograde airflow, inconveniences such as fogging of glasses, reflux with continuous positive airway pressure in apneic patients^(1,3) and the inability to perform the Valsalva maneuver have become apparent. Mani and Carpentier reported a patient who had to remove his unilateral Jones tube in order to continue scuba diving.² He was unable to perform the Valsalva maneuver, because the maneuver resulted in air decompressing through the Jones tube into the diving mask; however, the patient did not suffer an eardrum perforation.

Success rates of Jones tube use are multifactorial and depend on the etiology of the obstruction, the surgeon's

expertise, and variation in tubes and in patient anatomy. This case of tympanic membrane perforation highlights the need to counsel patients who pursue special activities before proceeding with surgical intervention.

Literature Search

Google Scholar was searched, without date restriction, for English-language results in April 2013 using the following terms: *Jones tube*, *tympanic perforation*, *snorkeling*.

References

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