



Pediatric myringoplasty: A study of factors affecting outcome

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ABSTRACT

Objectives: To analyze the success rates of myringoplasty in children, to assess prognostic factors and to evaluate their interactions in the evolution of myringoplasty.

Methods: Charts of patients who had undergone a myringoplasty between 1997 and 2007 were reviewed for: patient age, sex, perforation side, etiology, size, type and location of perforation, season of surgery, type of myringoplasty, surgical technique, graft material, preoperative status of the operated and contralateral ear, history of otologic surgery to the operated and/or contralateral ear, number of prior surgeries to the operated and contralateral ear, time elapsed between the last otologic procedure and this myringoplasty, history of adenoidectomy or tonsillectomy, time elapsed between the adenoidectomy or tonsillectomy and this myringoplasty. Anatomical success was defined as postoperative intact tympanic membrane (TM). Audiological success was defined as air bone gap less than 20 dB and a postoperative difference of no more than 10 dB in the mean bone conduction (BC) threshold.

Results: A total of 201 cases of myringoplasty were operated between 1997 and 2007. Anatomical success rates were 94.9%, 84.9% and 70.1% at 6, 12 and 24 months, respectively. The type of previous otologic surgery in the operated ear was found statistically significant for anatomical success. Audiological success rates were attained in 97.4%, 93.4% and 84.9% of patients at 6, 12 and 24 months, respectively. A mean reduction of 9.1 dB of the air bone gap was achieved postoperatively. No sensorineural hearing loss occurred. Children 12 years and older presented with statistically poorer preoperative BC at frequencies ≥ 2000 Hz when compared to their younger counterparts. These results suggest that the chronicisation of the TM perforation can result in long-term irreversible damage to the inner ear.

Conclusion: The type of previous otologic surgery in the operated ear was found to have an impact on anatomical success. The outcome for myringoplasty was more favourable when the etiology of the previous surgery was a benign one. We advocate early myringoplasty, preferably above the age of 6. Delaying surgery can cause permanent damage to the inner ear. All other factors evaluated were not found to be statistically significant for anatomical or audiological success.

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1. Introduction

Myringoplasty is one of the most commonly performed surgical operations in children. The most prevalent etiologies for tympanic perforations in children are complicated otitis media, iatrogenic perforations from previous installation of myringotomy tubes and traumatic perforation of the eardrum. For the minority that do not resolve after a period of six months, myringoplasty is to be considered [1].

Despite its relatively common use in the pediatric population, myringoplasty remains a controversial subject and its success rates

vary widely throughout the literature. The main topics of debate are the optimal age for the procedure, its indications as well as the choice of the surgical technique. Cochlear function is generally excellent in children allowing for a high probability of restoration and preservation of hearing [2,3]. A significant hearing loss may be the result of a large perforation, which may have further repercussions on speech and language development. These repercussions become especially significant if the hearing impairment occurs at a young age [2,4]. Another important argument in favour of myringoplasty is to hinder the migration of the squamous epithelium cells into the middle ear to form a cholesteatoma [3,5]. Overall, valuable arguments can be made for both proceedings, where myringoplasty can be performed at a young age or delayed until the child is older. The absence of precise selection criteria, as well as the diverging opinions concerning the timing and the indications for myringoplasty generates confusion not only for medical professionals, but also for the parents who are the ultimate decision makers in the postponement of their child's

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Table 1

Anatomical and audiological success rates for evaluated factors.

Variable	Criteria	N	Anatomical success: p value	Audiological success: p value
Sex	Female	96	$p = 0.733$	$p = 0.230$
	Male	105		
Side of perforation	Right	83	$p = 0.271$	$p = 0.337$
	Left	118		
Season	Winter ^a	46	$p = 0.200$	$p = 0.028$
	Spring	62		
	Summer	46		
	Fall	47		
Etiology of perforation	Otitis media	55	$p = 0.363$	$p = 0.911$
	Adhesive otitis	35		
	Unknown	30		
	Recurrent perforation, trauma, previous tubes	81		
Location of perforation	Anterior ^b	52	$p = 0.767$	$p = 0.026$
	Posterior	39		
	Antero-posterior ^a	83		
Size of perforation	Grade I	58	$p = 0.815$	$p = 0.020$
	Grade II	47		
	Grade III	35		
	Grade IV ^a	31		
	Intact	26		
Type of perforation	Marginal	36	$p = 0.635$	$p = 0.716$
	Central	137		
Operated ear	Dry	195	$p = 0.428$	$p = 0.549$
	Wet	6		
Previous otologic surgery of the operated ear	Previous surgery	143	$p = 0.457$	$p = 0.947$
	Operated once	86		
	Operates twice	40		
	Operated three times or more	17		
	Type		$p = 0.552$	$p = 0.372$
	M/T	105		
	Other otologic surgery	38		
Contralateral ear	N years elapsed since surgery (range 0.17–12 yrs) (mean 4.6 ± 3.01 yrs)			
Previous otologic surgery of the contralateral ear	Dry	153	$p = 0.913$	$p = 0.419$
	Wet	38		
Previous otologic surgery of the contralateral ear	Previous surgery	125	$p = 0.194$	$p = 0.266$
	Operated once	73		
	Operates twice	34		
	Operated three times or more	18		
	Type		$p = 0.436$	$p = 0.756$
	M/T	95		
	Other otologic surgery	30		
Adenoidectomy	N years elapsed since surgery (range 0.08–15 yrs) (Mean 6.27 ± 3.81 yrs)			
Tonsillectomy	Adenoidectomy	76	$p = 0.900$	$p = 0.752$
	N years elapsed since surgery (range 0.08–15 yrs) (Mean 6.27 ± 3.81 yrs)		$p = 0.341$	$p = 0.278$
Type of myringoplasty	Tonsillectomy	42	$p = 0.475$	$p = 0.619$
	N of years elapsed since surgery (range 1–11 yrs) (Mean 5.33 ± 3.29 yrs)		$p = 0.241$	$p = 0.374$
Surgical technique	Type I	179	$p = 0.050$	$p = 0.136$
	Type I + myringotomy tube	15		
Surgical approach	Underlay	178	$p = 0.123$	$p = 0.837$
	Overlay	22		
Graft material	Endaural	105	$p = 0.466$	$p = 0.721$
	Post-auricular	96		
Graft material	Temporal fascia	140	$p = 0.141$	$p = 0.947$
	Perichondrium	60		

N: number and M/T: myringotomy with tube insertion.

Bold values represent a statistically significant difference.

^a Poorest outcome.^b Better outcome.

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