Original Article

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Determining the Role of Time in Removing Mastoid Pressure Bandages after Tympanoplasty or Tympanomastoidectomy

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Abstract

Background: Mastoid Pressure Dressing (MPD) has been commonly used by otolaryngologists from 1960 as a post-operative care after mastoid or middle ear surgeries. MPD may be removed after the first day or 5 days after the surgery but it is not clear whether early or late removal is associated with less side effects. To clarify the optimal time of MPD removal, we conducted this prospective study.

Methods: A total of 56 patients, including 19 males and 37 females with the mean age of 38.23±15.9 years, were included in this study. Among these, 31 patients underwent early MPD removal (after one day) and for the other 25 patients, MPD was removed five days following the surgery, Tympanoplasty or Tympanomastoidectomy.

Results: There was no significant difference between the two groups in gender distribution or mean age. In addition, no significant between-group difference was detected in developing hematoma and sleep disturbance, but patients with late MPD removal showed higher rates of headache and erythema.

Conclusion: Current study suggests that MPD may be removed as soon as possible after the surgery due to its side effects inducing headache and irritation.

Keywords: Bandages, Humans, Mastoid, Otolaryngologists, Sleep, Tympanoplasty

Introduction

Mastoid Pressure Dressing (MPD), is formed by large sterile gauze swabs wrapped tightly over mastoid, ear, and head to cover operated ear in either middle ear or mastoid surgeries (1). By introduction of temporalis fascia as a graft for myringoplasty by Heermann, application of MPD following otologic surgeries has increasingly become the method of choice among Otolaryngologists around the world (2). As the name implies, MPD compresses the operated ear against the head and by decreasing the potential dead space, prevents hematoma or seroma formation. Several studies have questioned the role of MPD in reducing the risk for hematoma/seroma formation. Despite arguments on its effectiveness, as there is no suitable replacement for reducing the risk for hematoma formation, MPD is still of wide use after otologic surgeries (3). While a small number of studies suggest that MPD reduces the risk of infections, several studies recommend that MPD has an adverse effect on wound health as it increases the chance of infection (4). Accordingly, Castelli *et al* suggested that MPD should be removed either within 5 to 8 days or first 24 hours following the surgery to assess any hematoma formation or excessive bleeding from the external ear canal (5). However, it is not elucidated in the current literature whether a delay in removing the mastoid bandage can minimize the complications or not. Hence, we conducted a prospective randomized study to clarify the role of MPD removal time in reducing post-operative complications.

Materials and Methods

This is a prospective two-arm study which was carried out in the Valli-e-Asr Hospital, located in Tehran, Iran, from 2014 to 2015. The current study was approved by ethical committee of Tehran University of Medical Sciences and was in accordance with WMA declaration of Helsinki for medical research including human subjects (https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/). All the patients who underwent either Tympanoplasty or Tympanomastoidectomy surgery during the mentioned period, were included in the study. Patients with a known history of skin allergies or chronic headaches were excluded. All the patients were randomly allocated to one of the following groups using simple randomization method: 1) Mastoid pressure dressing was removed a day following the surgery (group A); and 2) Mastoid pressure dressing was removed five days following the surgery (group B). All the patients were fully examined by a fourth-year otolaryngology resident, who was blind to the patient's allocation, from several aspects including wound infection, skin erythema, hematoma, or seroma, within the first 10 days after hospital discharge in otolaryngology outpatient clinic. In addition, all the patients were asked if they had experienced headache and sleep disturbance following surgery. Since all the patients were older than 3 years, only Wong-Baker Faces Pain Rating Scale was employed for the assessment of their headache. For assessing the sleep disturbance, they were asked the following question: "How did you feel about your sleep quality when you had a head bandage?" and were asked to answer this question on a 0 to 10 scale, *i.e.,* score of 0 revealed that there had been no sleep disturbance, whereas the score of 10 indicated that sleep had totally been disturbed.

To compare the demographic data and the outcomes of interests between the two groups, *t* test, chi-square or Fisher's exact test were utilized and statistical analyses were performed using SPSS version 16 (SPSS, Inc., Chicago, IL). A p-value less than 0.05 was considered statistically significant.

Results

Demographics

56 patients were enrolled in this study and were allocated to two intervention groups: 31 (55.4%) patients were allocated to group A (early MPD removal) and 25 (44.6%) to group B (late MPD removal). Among the total patients included, 19 (33.9%) were male whereas 37 (66.1%) were female. Mean age was 38.23 years, with the minimum and maximum of 9 and 68 years, respectively. The details of patients' demographics have been provided in table 1. There was no significant difference in gender distribution (p=1.000) and age (p=0.547) between the two groups (p-value=1.000).

Adverse outcomes of early and late MPD removal:

Neither wound infection nor seroma formation were observed in any of the patients. There were no findings in favor of developing hematoma after removing the

Table 1. Patients' Demographics

	Total	Early MPD removal	Late MPD removal	p-value
Number of patients	56	31 (55.4%)	25 (44.6%)	
Age (mean ± SD)	38.23 ± 15.9	40.19 ± 14.68	35.8 ± 17.35	0.547 §
Female (n, %)	37 (66.1%)	20 (64.5%)	17 (68%)	1.000 ¶

SD: Standard Deviation; MPD: Mastoid Pressure Dressing.
§ Independent samples t test. ¶ Chi-square test.

Table 2. Patients' complications distribution

	Early MPD removal	Late MPD removal	p-value
Hematoma Number (%)	0 (%)	1 (4%)	0.448 ¶
Seroma Number (%)	0 (%)	0 (0%)	------
Wound Infection Number (%)	0 (0%)	0 (0%)	------
Skin Erythema Number (%)	0 (0%)	4 (16%)	0.034 ¶
Headache score (mean ± SD)	0.94 ± 0.31	3.24 ± 0.61	0.030 §
Sleep Disturbance score (mean ± SD)	0.94 ± 0.29	1.64 ± 0.369	0.088 §

SD: Standard Deviation; MPD: Mastoid Pressure Dressing
§ Independent samples t test. ¶ Fisher's exact test.

MPD in patients with early MPD removal while one of the patients with late MPD removal (4%) developed hematoma, although no between-group difference was detected (p=0.448). In addition, four patients (16%) with late MPD removal developed erythema on lobule of auricle, while none of the patients in the early MPD removal group did. There was a significant difference in developing erythema between two groups (p=0.034). The mean and standard deviation (SD) of the self-reported scores for headache and sleep disturbance in patients with early MPD removal were 0.94±0.311 and 0.94±0.29, respectively. In the other group with late MPD removal, mean and SD of the self-reported headache and sleep disturbance were 3.24±0.617 and 1.64±0.36, respectively. There was a significant difference between two groups in developing headache (p=0.03), while there was no statistically significant difference between two groups in sleep disturbance (p= 0.088). Table 2 summarizes the outcomes in early and late MPD removal groups.

Discussion

Our findings showed that early removal of MPD is associated with similar rates of post-operative hematoma formation and lower rates of skin erythema and headache compared to late MPD removal. By this study we claimed that delay in removing MPD is not an effective method for preventing from developing hematoma.

MPD is a type of occlusive dressing in which a high compression is induced by multilayered gauze strips over the operated ear, mastoid, and head to prevent the operated site from developing seroma or hematoma by declining the dead spaces. This method is commonly being used for closing the wounds following otologic surgeries after it was first introduced by using

temporalis fascia graft in tympanoplasty by Heermann in 1960 (6). Rowe-Jones *et al* and Gurgel *et al* found no difference in the incidence of hematoma or seroma formation in patients with or without pressure dressing after otologic surgeries including middle ear surgery (7,8). Accordingly, Khan *et al* performed a systematic review showing that head bandages were not required after routine, uncomplicated middle-ear surgery (3). In addition, Hill *et al*, by measuring the pressure exerted by head bandages, concluded that after the first hour of wrapping the head bandage, it loses the adequate pressure required for preventing hematoma formation (9). In 2009, Luo *et al* suggested that the use of compression bandages after uncomplicated cochlear implantation surgeries should be deserted (10). Since these surgeries are usually uncomplicated, Okur *et al* recommended that using MPD is not necessary in tympanoplasty surgeries with or without mastoidectomy (11). Due to lack of any suitable replacement for removing hematoma, despite controversies over its effectiveness, MPD is widely being used. Unlike Marshall *et al*, Laforet *et al*, and Bennett RG *et al* who concluded that MPD potentiates the risk of wound infection, we did not reach any findings in favor of increased wound infection (12-14).

In this study, similar rates of hematoma formation were observed in late *vs*. early MPD removal. It was suggested by Castelli *et al* that MPD should be removed either within 5 to 8 days or first 24 hours following the surgery to assess any hematoma formation or excessive bleeding from the external ear canal (5). Moreover, in a retrospective study by O'Brien *et al*, it was shown that MPD removal two hours following surgery is safe and associated with no hematoma or seroma formation, excessive oozing, skin irritation or wound infection (15). Despite the efforts to assess the complications after early MPD removal, there is no consensus whether early MPD removal is associated with less adverse outcomes compared to late MPD removal, the issue addressed in this study. Despite similar rates of hematoma formation, the current study suggests that delay in removing MPD significantly enhances the risk of skin erythema, a complication which is disturbing to patients. Similarly, Demir Y *et al* stated that long-term head bandages increase the risk of skin erythema and necrosis, necessitating that patients come for a visit on the first day after surgery for removing the head bandages (16). In addition, in this study patients with late MPD removal experienced a significantly higher intensity of headaches, but the between-group difference in sleep disturbance was not statistically noticeable. To the best of our knowledge, prior studies have not specifically addressed headache and sleep quality and their severity following middle ear surgeries and their association with the time of MPD removal. Concerning the fact that lower headache intensity observed in patients with early MPD removal, showed similar rates of hematoma formation and lower rates of skin erythema and lower severity of headaches compared to patients undergoing late MPD removal, it can be concluded that MPD should be removed early after surgery. However, it should be kept in mind that this study suffers from some limitations such as small sample size which restricts us to correctly estimate the relatively rare complications like hematoma formation. Future studies with larger sample sizes may be useful in confirming or rejecting this claim.

Conclusion

Long-term MPD does not play a prominent role in diminishing the formation of hematoma or seroma after tympanoplasty or tympanomastoidectomy and is associated with higher rates of some disturbances in patients' normal life by causing skin erythema and headaches.

Recommendations

MPD removal should be considered as soon as possible after the surgery to limit its side effects such as skin irritation and post-surgical headaches.

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Conflict of Interest

The authors did not mention any conflict of interest.

Ethical Approval

This study is compatible with institutional ethics committee

regulations and WMA declaration of Helsinki for medical research including human subjects (https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/).

Consent

Informed consent was taken from the patients included in this study.

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