# Canal wall down mastoidectomy and causes of failure review of 25 patients

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## ABSTRACT

***Objective:*** To study the causes of failure (canal wall down) mastoidectomy procedure.
***Design:*** A prospective case series study.
***Setting:*** ENT department, Al-Jamhory Teaching Hospital during the period of May 1996 to May 2000.
***Participation:*** Twenty five patients underwent canal wall down operation over a period of four years. They were reviewed for the final result after the operation.
***Results:*** Fifteen patients were noticed to have complete dryness and healing. Eighty percent of the patients get dry ear within the first three months after the operation. Failure to get healed cavity was seen in patients with large cavities, high facial ridge and inadequate meatoplasty.
***Conclusion:*** Recognition of the possible causes of failure to get dry ear, the surgeon's experience and the regular follow up of the patient, may help in achieving better results.

## الخلاصة

**الهدف:** دراسة أسباب فشل شفاء (جوف الخشاء) بعد عملية قطع الخشاء وتنزيل جدار القناة.
**التصميم:** دراسة لسلسلة من الحالات.
**المكان:** المستشفى الجمهوري التعليمي، شعبة الأذن والأنف والحنجرة.
**المشاركون:** خمسة وعشرون مريضاً أجريت لهم العملية للفترة من أيار ١٩٩٦ وحتى أيار ٢٠٠١.
**النتائج:** خلال ستة أشهر من إجراء عملية قطع الخشاء وتنزيل جدار القناة تمت ملاحظة جفاف وشفاء جوف الخشاء لدى ١٥ مريض من أصل ٢٥ مريضا، لوحظ أن ٨٠% من حالات الجفاف والشفاء قد حصلت في الأشهر الثلاثة الأولى بعد العملية كذلك لوحظ أن نسبة الجفاف والشفاء في الأجواف الصغيرة وفي الأجواف ذات الحرف الوجهي الواطئ وكذلك الأجواف ذوات الرأب الصحافي المناسب قد تصل إلى ٨٠%. من ناحية أخرى تبين أن نسبة الجفاف تتناسب عكسيا مع المرضى المصابين بالورم الكولسترولي عند المقارنة بالمرضى المصابين بالتهاب الأذن الوسطى ذات النسيج الحبيبي المزمن.
**الاستنتاج:** أظهرت النتائج أن من أسباب فشل العملية هو تصنيع الأجواف الكبيرة والأجواف ذات الرأب الصحافي الضيق وكذلك الأجواف ذوات الحرف الوجهي العالي. وحيث أن خبرة الجراح في إجراء العملية وانتظام متابعة المريض من العوامل المهمة في الحصول على نتائج أفضل.

Managements of chronic ear disease with or without cholesteatoma are dominated by canal wall down philosophy[1]. Such an open procedure ensures disease control and uncomplicated future[1]. Around 80% of the cavities created by surgery undergo epithelialization by in-growth of the epithelium from the external canal[1,2]. The time consumed by complete epithelialization and thus healing may range form 6-12 weeks[3,4]. Still 20% of mastoid cavities remain moist even six months after surgery[5].

Furthermore, around (40%) of those which have initially healed may begin to discharge subsequently[5]. According to Palva, (10%) of mastoid cavities may discharge continuously and (20%) may be occasionally moist[6]. Bowdler and Walsh, in their series of open mastoid procedure, observed constantly discharging cavities in (35%) of cases. According to Nadol and

also Bashia[8,9], the causes of discharging cavities may include the followings:-

1- Incomplete exentration of infected mastoid air cells.
2- Residual or persistent cholesteatoma.
3- Irregular-shaped cavity.
4- Cavities with prominent mastoid tip.

In this study we review the results of (25) patients during six months after surgery, taking in consideration: the size of the cavity, the height of the facial ridge and the adequacy of meatoplasty as factors affecting the state of healing and dryness after surgery.

## PATIENTS AND METHODS

In 4 years period from May 1996 to May 2000, (31) patients underwent canal wall down mastoidectomy at the ENT Department, Al-Jamhory Teaching Hospital, Mosul.

Post operative follow-up for six months was possible for only (25) patients, and these are the subject of this study.

Of the (25) patients, (16) were females and (9) males. Their age ranged between (15-60) years.

Cholesteatoma disease was found in (11) patients, and chronic granulating disease in (14) patients.

In the first group two cases were recurrent cholesteatoma, and one case presented with post aural fistula (natural matoidectomy).

Extensive disease process and disturbed normal anatomy imposed great difficulty during surgery in dealing with the facial ridge properly, and here the surgeon's skill is vital in lowering the ridge without damaging the facial nerve.

The size of the resulting marsupialized cavities was measured by filling method using physiological saline, and the cavities thus were classified into three sizes,

- Small sized cavity up to 2 ml.
- Medium sized cavity up to 3 ml.
- Large sized cavity more than 3 ml[10].

Meatoplasty fashioned through the posterior meatal skin incision, the meatal cartilage was dissected, and the skin edges were reflected in toward the mastoid cavity and sutured on to the adjacent soft tissue to maintain wide opening meatoplasty.

Patients were usually kept in hospital till removal of the skin sutures on the 7th day.

Follow-up attendance was well explained to the patients before discharge.

Meatoplasty was considered being adequate when the opening allowed the insertion of a large size aural speculum through which the whole of the cavity could be inspected easily.

## RESULTS

Dry and healed mastoid cavities were noticed in (15) patients within six months after surgery (60%). More than (80%) of these cavities (12) achieved dryness in the first three months after surgery.

Of the (11) cholesteatomatous patients only (3) were found to have dry cavity (27%), while in patients from the non-cholesteatomatous granulating disease a dry cavity was recognized in (11) patients (78%), as shown in table (1).

Of the (8) cases with small cavity, (6) patients (75%) were seen to have dry cavity. From the (8) patients with medium sized cavity, (5) patients were recognized to have dry cavity (71%). On the other hand, the (9) patients with large cavities only (3) developed dryness (33%) as shown in table (2).

**Table (1):** *Shows disease type / state of dryness.*

| Pathology | Dry | Discharging | Total |
|---|---|---|---|
| Cholesteatoma | 3(27%) | 8(73%) | 11 |
| Non-Cholesteatoma | 11(79%) | 3(21%) | 14 |
| Total | 14 | 11 | 25 |

**Table (2):** *Shows cavity size / state of dryness.*

| Cavity size | Dry | Discharging | Total |
|---|---|---|---|
| Small | 6(75%) | 2(25%) | 8 |
| Medium | 5(71%) | 3(29%) | 8 |
| Large | 3(33%) | 6(67%) | 9 |
| Total | 14 | 11 | 25 |

**Table (3):** *Shows facial ridge / state of dryness.*

| Height of ridge | Dry | Discharging | Total |
|---|---|---|---|
| High ridge | 0 | 6(100%) | 6 |
| Low ridge | 17(90%) | 2(10%) | 19 |
| Total | 17 | 8 | 25 |

**Table (4):** *Shows Meatoplasty / state of dryness.*

| Meatoplasty | Dry | Discharging | Total |
|---|---|---|---|
| Adequate | 14(7 7%) | 4(23%) | 18 |
| Stenosis | 1(14%) | 6(86%) | 7 |
| Total | 15 | 10 | 25 |

Dry mastoid cavity was never achieved in six patients with high facial ridge (100%). Conversely (17) patients developed dry cavity from the (19) cases in whom the facial ridges were adequately lowered down by surgery (90%) as shown in table (3).

During follow-up, (7) patients developed stenosis of the meatoplasty opening (6) of them failed to show dry cavity (86%) while in (18) patients with adequate meatoplasty (4) patients only failed to show dry cavity (23%), table (4).

## DISCUSSION

Some published reports give figures up to 80% rate of dryness after canal wall down mastoidectomy[1,6]. In this study, 60% is obviously lower than the above figure but we are still in agreement with other studies in that:

1-Most of the open cavities are dry after surgery[7-10].

2-The fact that 30%-60% of the cavities are prone to discharge again after an initial healing[5].

3-The relatively high number of cholesteatomatous diseases in this series is due to the prevalence of cholesteatoma in this country.

In this study, dry mastoid cavity was noticed in a small number of patients with cholesteatomatous disease and this is in agreement with other published reports in that cholesteatoma is a burdensome disease with great tendency for residual and recurrent pathology[4,8] and thus a significant proportion of cavities remain discharging after surgery[8,12,13].

In this study most of the small and medium sized cavities were dry, while most of the large cavities were discharging after surgery. These findings are supported by others in that the smaller the size of the cavities the more satisfactory are the results[10,12,15].

However, the traditional approach to the pathological lesion from its posterior aspect and the inevitable removal of much bone usually results in large cavity, incomplete epithelization and also troublesome cavity[10,14,16].

The facial ridge was adequately lowered in (19) patients; (89%) of them had dry cavity. This figure is in agreement with other studies which give more than (80%) dryness with low facial ridge[10].

The facial ridge was not lowered adequately in six patients to avoid inflicting damage to the facial nerve. These cavities remained disharging which indicate that high facial ridge is one of the most imprtant factors that promote persistent disease[11-13] and its lowering is necessary to prevent this effect by transforming the classical "Bean-shaped" cavity in to "Round-shaped" cavity[16,17]. Seven patients developed stenosis of the meatal opening. Only one of them showed dryness (14%), whereas in cases with adequate meatoplasty opening 85% of the cases developed dry cavity and this is in agreement with other studies in that stenosed meatoplasty decreases the chances of dryness[10,14].

One of the important steps in the creation of trouble-free cavity is obtaining an adequate meatoplasty opening to provide adequate surface-volume ratio for aeration, epithelial stability and good post-operative visualization[8,12,18].

***Conclusion:*** The rates of failure or success following canal wall down surgery are determined by many factors. Among these are the size of the created cavity, the height of the facial ridge and the width of the fashioned meatoplasty which are important factors that affect the result of surgery. The operative technique and the experience of the surgeon also play a role in achieving results. Regular follow-up and cleaning of the cavity from debris also enhance epithelialization to achieve dry ear.

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