DISCHARGING OPEN MASTOID CAVITY CONTRIBUTING FACTORS & APPROACH TO MANAGEMNT

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الخلاصة:- يعد صديد الأذن الوسطى المزمن أحد المؤشرات الموجبة لجراحة الأذن والنتوء ألحلمي، إضافة إلى أنها من النتائج المهمّة التي تعقب هذا النوع من الجراحة . يعرف التجويف ألحلمي النادح بأنه التجويف النادح (بعد العمليّة الجراحية) بأنه ذلك التجويف الذي يستمر بالتقيح بعد أجراء عملية استئصال النتوء ألحلمي الجذرية باستمرار لفترة تتراوح بين 3- 6 أشهر.ان مسببات هذه التجاويف النادحة متعددة. تسلط هذه الدراسة الضوء على العوامل المسببة لاستمرار تدفق صديد الأذن عقب عمليات استئصال النتوء ألحلمي الجذرية, فمنها ما له علاقة بالتقنية الجراحية وأخرى بالمتغيرات التركيبية و الوظيفية لقناة أوستاكي إضافة لمقدار عناية المريض بالأذن بعد العملية, و كذلك تسلط الدراسة الضوء على تقييم التجويف الناتج من هذه العمليات و تضع الأسس لمعالجة مثل هذه النتائج.

Abstract:-

Chronic ear discharge is one of the indications of mastoid surgery, however; this persistent discharge may be the outstanding feature of complicated surgery ““Discharging open mastoid cavity”. Discharging open mastoid cavity is defined as persistently discharging cavity following canal-wall down mastoidectomy for a period more than 3-6 months.The etiology of this discharging cavity is mutifactorial.

This study focuses the light on the contributing factors of the persistence of ear discharge after canal-wall down mastoid surgery: surgical , bacteriological & structural (Eustachian tube function).Fifty patients with discharging cavity & 40 patients with dry cavity were gathered from the outpatient department of Al-Najaf teaching hospital during the period between " October 2002- November 200 . They were evaluated for discharging open mastoid cavity after canal-wall down mastoidectomy & was found that this problem is mutifactorial in etiology both surgical & non-surgical. We concluded that meticulous surgical technique is essential to prevent such a complication, beside prompt follow up to ensure dry cavity postoperatively.

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Introduction:

Chronic suppurative otitis media is one of the common health problems & is characterized by painless persistent or intermittent ear discharge which constitutes a major indication of mastoid surgery. Surgery is aiming at eradicating the disease & converting it from unsafe to a safe type of ear disease; .beside the prevention of complications "Intracranial abscesses, and facial nerve palsy [1]

Discharging open mastoid cavity [2] is defined as persistent ear discharge after open mastoid surgery "canal-wall down mastoidectomy", for a period of 3-6 months. It presents a major health problem to patients and surgeons & is caused by several problems. It is estimated to occur in 10-30% of cases after open cavity mastoidectomy. It has been concluded that there are two groups of contributing factors3 :

1/ surgery- related factors;

a/ Adequate excision of the disease:- The appearance of granulation tissue post-operatively is considered to reflect inadequate surgical exenteration of air cells. Young's (1992) studied histological material from the cavities & found that retained mucosa in the mastoid air cells was seldom the source of discharge ; therefore; it is reasonably not to follow the cell system down the mastoid tip thereby limiting the size of the cavity & in particular the mastoid bowl sump.He concluded that an active discharging mastoid cavity is because of superficial granulation tissue which may take on a polypoidal character rather than because of continued discharge from respiratory type epithelium or osteitis in the underlying bone.

b/Size of cavity: -large cavity is associated with delayed epithelialisation.

c/Facial ridge: - high facial ridge is associated with discharging mastoid cavitya

d/Adequate & Functioning meatoplasty

2/ Patient- related factors:-

A- Eustachian tube function.

B- Frequency of URTI.

C- Adequate aural hygien

D- Water contamination

E- Evidence of systemic diseases.

According to Beals & Hynes (1958) 20% of mastoid cavities remain unhealed 6 months after surgery & of the remainder some begin to discharge again subseqently. The reported frequency of discharge varies between 30-60%. Cavities are more likely to be dry if they are not

excessively large, have low facial ridge, an adequate meatal opening & closed middle ear space5.

Various surgical approaches to the discharging open mastoid cavity have been described;

1/ CAVITY REVISION;- is likely to result in a dry ear in 57% of cases , while the combination of this approach with meatoplasty increases the success rate to 83% 5,6.

2/Obliteration of mastoid cavities :-have been described using a pedicle muscle flap or mucuperiosteal flap 6 . An alternative approach uses a mixture of bone dust & water (bone pate) to fill the mastoid bowl .This technique results in dry ear in 63-74% of cases 7.

The study was aiming at;-

1/ Evaluating the problem of ear discharge after mastoid surgery . Its contributing factors
(bacteriological, structural & functional) .

2/ Establishing an effective line of management of discharging mastoid cavity; medical & surgical.

PATIENTS & METHODS

Fifty patients attending the ENT department of Al-Najaf teaching hospital were studied prospectively all with discharging open matoid cavity & history of canal- wall down mastoidectomy in the form of modified radical or radical mastoidectomy beside 40 patients with dry mastoid cavity as a control group.

They were evaluated according to history, physical examination {:including operative microscopic examination}, bacteriologic study (pre-operative & post- operative) and Eustachian tube function by tympanometry.; in addition to radiological evaluation of the extent of the disease (by CT- scan examination) . .

The physical examination was stressed on evaluating :-

1/ The meatoplasty opening:- whether adequate allowing easy inspection of the cavity using a metal speculum size " 3 " or inadequate opening.

2/ Height of facial ridge:-whether high or low down to the floor of external auditory canal.

3/ Size of the mastoid cavity;- using liquid filling method by measuring the volume of instilled normal saline using 1 ml insulin (G 26 X 1/2) . The size of the cavity was classified into small (< 1.5 cc) or large cavity (> 1.5 cc). 4/ Extent of epithelialisation of mastoid cavity By operative microscope examination.

The patients were followed up & managed either conservatively or surgically accordingly (revision surgery at least 3 - 6 months after the primary mastoid surgery).The conservative line of treatment includes: -

1/Good aural toilet: - frequent mopping (dry coton buds eiher self - made or prepacked sterile ones), suction clearance (under GA sometimes).
2/Systemic antibiotic cover according to culture & sensitivity (for aerobic & anaerobic infections)
3/ Topical therapy:-There are two types of topical therapy being used:
a/Topical antiseptic agents:-A solution containing white viniger (to provide an acid media & to counteract alkaline pus) diluted 1:2 with water at body temperature and repeated twice daily.
b/ Topical antibiotic/steroid preparations (using neomycin , polymxin B & betamethazone)

RESULTS

There were 90 patients (60 males &30females) with a ratio of 2:1; their ages were ranged between 13-58 (mean35) years.

Table – 1 – The surgical factors

Surgical factors	Wet (50)	%	Dry (4o)	%
Granulation tissue	39	78%	----	---
Large cavity	37	74%	16	38%
High facial ridge	14	28%	2	4.86%
Residual cholesteatoma	14	28%	----	----
Inadequate meatoplasty	10	20%	----	----

Table – 2 – The non- surgical factors

Non surgical factor	Wet (50)	%	Dry (40)	%
Eustachian tube dysfunction	29	58%	-------	
Water contamination	26	52%	12	28.6%
Infrequent cleaning of ear	20	40%	10	23.81%
Frequent upper respiratory tract infection	9	18%	----	-----
Evidenc of systemic diseases	3	6%	-----	----

Table – 3 – Type of Bacterial growth

Type of growth	Preoperative NO.	%	Postoperative NO.	%
Aerobic mono infection	41	82	38	76
Aerobic mixed infection	9	18	10	20
N0 isolated growth	---	---	2	4
Total no.	50	100	50	100

Table –4– Types of isolated organisms

Micro- organism	Preoperative isolate		Postoperative isolates	
	%	No.	%	No.
Pseudomonas	63.33	38	68.97	40
Proteus	18.33	1	17.24	10
Staphylococci cocci	13.33	8	8.62	5
Klebsiella	3.3	2	1.72	1
E.coli	1.68	1	3.45	2

Table –5- Surgical findings in revision mastoidectomy

Surgical Findings	No.	%
Granulation tissue:-	16	80
Tegmen	10	50
Sinodural angle (SDA)	8	40
Tip	4	20
Facial recess	3	15
Residual cholesteatoma	14	70
Large cavity	7	35
High facial ridge	6	30
Inadequate meatoplasty	5	25

Discussion

In this study; 9o patients were studied prospectively, They were classifid into group A; that includes those with history of canal- wall down mastoidectomy & persistent wet mastoid cavity ; in this group 50 patients were included.Group –B- includes those with history of mastoid

surgery & dry postoperative mastoid cavity & 40 patients were included . 39 patients (78%)of the wet group were developed granulation tissue post-operatively compared to 56% reported in Palva & Nadol series 4) which reflects incomplete exenteration of the diseased mucosa & air cell system due to technical causes or fear of injuring vital structures like dura or facial nerve so that air cells are left unexteriorised unless a delibrate effort is made to remove them . Large cavities were found in 37 (74%) compared to 16 patients of the dry group which suggests that more time is needed for healing by squamous epithelium & the retained mucosa is more prone for contamination & infection. This is in comparison to other series having 61% of large cavities to be wet (4,3). Residual cholesteatoma was found in 28% of patients & this may result from incomplete surgical removal or left purposely in case of errosion of lateral semicircular canal or around the stapes. About 86% of this residue were found in 11-30 years of age due to infilterating nature of cholesteatoma matrix in the pneumatised mastoid in young age group & its great potential for survival & growth.

High facial ridge was found in 28% of wet cavities compared to only 4% of the dry group indicating a significant advantage of the low ridge down to the level of the floor of the external canal to exenterate the facial recess & hypotympanic air cells and to promote drainage. It is often kept high avoiding injury to facial nerve . This compares favorably to 34-80% reported elsewhere 5,6.

Twenty percent of the wet cavities had inadequate meatoplasty and all the 42 dry ones had adequate meatoplasty which is useful for better post-operative ventilation & care. This is in comparison to 13-70% in other series.7

Forty percent had revisions, but it dosenot reflect the real no. who required revision mastoidectomy because some of whom refused second surgery. Three out of five revisions were due to restenosis of the meatoplasty despite the proper technique used & are due to contracting nature of the tissues 7..

Measurement of eustachian tube function using tympanometry revealed that 58% of wet cavities in the study had eustachian tube dysfunction which may indicate a role in the persistent discharge of open mastoid cavity since the tube promotes the drainage of the middle ear mucosal secretion , hence dysfunction leads to accumulation of secretions & the development of chronic suppurative otitis media. It is suggested that it plays a role in the persistence of a wet cavity , though the cavity is opened to outside since the eustachian tube is the natural pathway for drainage. Moreover, it is necessary to ventilate the middle ear mucosa & to keep it dry8..

Water contamination was encountered in 52% of wet ears. Six out of 10 patients with a single cause had only water contamination as a contributing factor probably due to higher tendency for bacterial infection. Cleaning of the ear "Aural toilet " was found to be infrequent in 40% of wet mastoids 9. Bacteriological study revealed no significant difference between the preoperative & postoperative state regarding the types & specificity of organisms10..

CONCLUSIONS

1/ Discharging mastoid cavities are multifactorial in etiology.
2/ Complete removal of cholesteatoma & exteriorisation of air cells with low facial ridge & creating smooth cavity with adequate meatoplasty are helpful to prevent this complication.
3/ Proper follow up is necessary to ensure a dry cavity postoperatively.

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