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P.O.Box: 37444 Tel: 00967 1 675567 Fax:00967 1 675885

**E-Mail :**

[magazine@andalusuniv.net](mailto:magazine@andalusuniv.net)

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# *Eagle's Syndrome: An Unusual Cause of Recurrent Retro mandibular Pain Case Report*

***Dr.Zain H. Alhaddad<sup>1\*</sup>***  
***Dr. Reda M.Fathy<sup>2</sup>***  
***Dr. Abdulwahab M. Al-Mutahar<sup>3</sup>,***  
***Omar M. Almashhoor<sup>4</sup>***

---

*1- Assistant Professor of Radiology; HUCOM; surgical department. Hadharmout University.*

*2- Visiting Consultant Otolaryngologist; Babakr Hospital; Hadhramout.*

*3- Assistant Professor of Radiology. College of Medicine, Thamar University.*

*4- 6<sup>th</sup> Year medical student, HUCOM.*



جامعة الأندلس  
العلوم والتقنية

Alandalus University For Science & Technology

(AUST)

## **Eagle's Syndrome: An Unusual Cause of Recurrent Retromandibular Pain Case Report**

### ***Abstract:***

Eagle's syndrome occurs when an elongated styloid process or calcified stylohyoid ligament causes recurrent throat pain radiating to the ipsilateral ear or retromandibular neck pain. Such symptoms easily confused with those caused by different facial neuralgias. Diagnosis usually made on physical examination by palpation of the styloid process on the tonsillar fossa. Computed tomography (CT) scan provides complementary information to that of plain radiography, including definition and relationship of the elongated styloid process to the surrounding soft tissue structures in the axial plane. Treatment is usually surgical with resection of the elongated part of the styloid process through trans-oral or external approach. We reported a case of 38-year-old male who presented to otolaryngology clinic with physical examination and radiological findings typical for Eagle's syndrome. Operation was done by consultant otolaryngologist who resected the elongated part successfully via trans-oral approach without complications. The patient was completely asymptomatic at follow up visit six months postoperatively. Awareness of Eagle's syndrome is important to all health practitioners involved in the diagnosis and management of neck and head pain because it can be confused with many other conditions that must be excluded.

**Keywords:** Eagle's syndrome; Retromandibular ,Neck pain; Elongated styloid process.

## **Introduction:**

Eagle's syndrome (ES) is characterized by craniofacial or cervical pain due to an elongated styloid process or calcified stylohyoid ligament. Patients with Eagle's syndrome may present with a sore throat, ear pain, or even with foreign body sensation in the pharynx secondary to pharyngeal and cervical nerve interactions. Watt.W. Eagle American otolryngologist was first who described the clinical findings of this syndrome in 1937<sup>(1)</sup>.

Since the symptoms are variable and non-specific, patients seek treatment in several different clinics such as otorhinolaryngology, family practice, neurology, neurosurgery, psychiatry, and dentistry<sup>(2)</sup>.

The normal length of the styloid process may vary, but with the majority of the population it is 20-30 mm long<sup>(3,4)</sup>. However, a 30 mm or longer process is considered anomalous and responsible for the so-called Eagle syndrome. ES is a rare entity which is not commonly suspected in clinical practice<sup>(5)</sup>. Approximately 4% of the population is thought to have an elongated styloid process, only a small percentage (between 4% and 10.3%) of this group is thought to actually be symptomatic<sup>(6,7)</sup>.

A diagnosis can usually be made by physical palpation of the styloid process in the tonsillar fossa. In addition, orthopantomography (OPG) or a cervical radiograph using a lateral projection, and computed tomography (axial and three-dimensional CT) are complemantary imaging modalities to confirm the diagnosis<sup>(8)</sup>.

Eagle syndrome can be treated both surgically and non surgically. The surgical approach is styloidectomy when the resection of the elongated part of the styloid process is

performed through trans-oral or extra-oral approach. The trans-oral approach was introduced first by Watt. W. Eagle, while the extra-oral approach, described by Loeser and Caldwell<sup>(9)</sup>. The most significant advantage of an external approach is enhanced exposure of the styloid process and the adjacent structures, and this outweighs all other considerations. It also facilitates the resection of a partially ossified stylohyoid ligament. Transoral resection causes no outside scars, but involves the risk of deep neck space infection (DNSI) and possible neurovascular injury<sup>(10-11)</sup>. Conservative treatment options have included transpharyngeal injection of steroids and lignocaine preparation close to the styloid process<sup>(7)</sup>. This option proved to be not efficient enough since symptoms recurs in most of the patients after 6-12 months<sup>(12)</sup>.

### **Case Report:**

A 38-year-old male with prior history of tonsillectomy two years before his recent presentation to Babakr charitable hospital Otolaryngology clinic, with complaints of persisting right side nagging retromandibular pain, which occasionally radiating to his right ear. He underwent outside tonsillectomy two years back for chronic hypertrophied tonsils with transient relief of his symptoms.

On transoral physical examination he had a palpable, mildly tender bony projection along the course of the styloid process on the right tonsillar fossa; pain was elicited during palpation. The examination of the contralateral tonsillar fossa was normal, supporting the diagnosis of Eagle syndrome .

Lateral cervical radiograph revealed elongation of the bony shadow of the styloid process on the right side. Further confirmatory neck CT scan without intravenous contrast media was obtained and showed elongated right styloid process seen as continuous visualization of the styloid process in the consecutive neck axial CT images up to the level of the oropharynx

(Figure1). Further 3D reconstructed coronal image showed the elongated styloid process with an approximate length of 40 mm (Figure2).

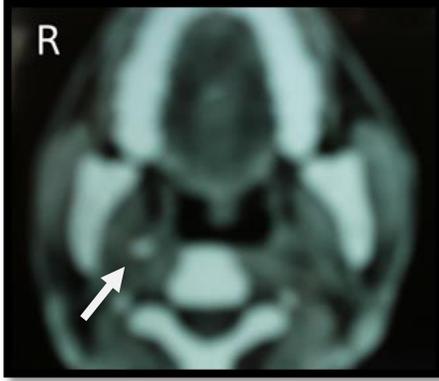


Figure 1: CT scan of the neck showing unilateral elongated styloid process on the right side. (arrow).

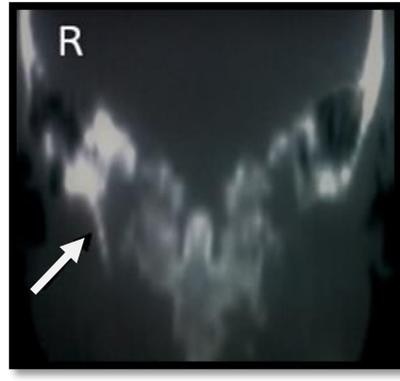


Figure 2: 3D CT scan, showing elongated styloid process on the right side.

Based on the clinical examination and radiological findings, surgical resection of the elongated styloid process was done by consultant ENT laryngologist under general anesthesia via trans-oral approach who resected the elongated part successfully without complications (Figure 3,4).

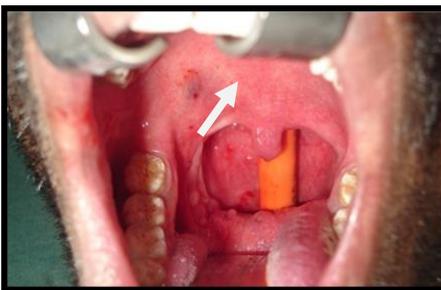


Figure 3: Showing the site of palpable bony projection on the right tonsillar fossa (arrow).



Figure 4: Intra operative (transoral approach) showing the elongated styloid process (arrow).

The length of the resected part of the styloid process was approximately 12mm (Figure4).



*Figure 5: Surgically excised segment of the styloid process*

The patient was prescribed oral 250 mg metronidazole for five days and 4.5 g parenteral cefuroxime was administered for a period of 72 hours, followed by 500 mg cefuroxime oral therapy for two days to prevent the DNSI. The patient had eventless, smooth post operative period and discharged home third day after operation. The operation resulted in complete disappearance of the patient complaints.

### ***Discussion:***

Although the incidence of the styloid process elongation or mineralization of the stylohyoid complex is not uncommon, only a small percentage 4% of this group is symptomatic. The vagueness of symptoms and the infrequent clinical observation are often misleading. These patients may be seen by a surgeon, a dentist, a neurologist, and a psychiatrist, often receiving a variety of treatments that do not relieve the symptoms and that cloud the clinical picture<sup>(6,7)</sup>.

Stylalgia is misdiagnosed or overlooked as a possible diagnosis in cases of vague cervicofacial pain. A variety of head and neck conditions should however be considered in the differential diagnosis of ES, these include temporomandibular joint disorders, glosso-pharyngeal neuralgia, trigeminal neuralgia, migraine type of headaches, sphenopalatine neuralgia, cervical arthritis, carotidynia, temporal arteritis, otitis media externa, salivary gland disease and possible tumours. Other pathology should be eliminated by a careful medical history, clinical and radiographic examination<sup>(13)</sup>.

Eagle considered tonsillectomy responsible for the formation of scar tissue around the styloid apex, with consequent compression or stretching of the vascular and nervous structures contained the retrostyloid compartment (in particular glossopharyngeal nerve and perivascular carotid sympathetic fibers)<sup>(14)</sup>.

Diagnosis can be usually made by physical palpation of the styloid process in the tonsillar fossa. In addition OPG or a cranial radiograph using a lateral projection can give a rough idea about the diagnosis. While CT scan confirms the diagnosis and provides precious information for the surgeon showing a more detailed view and measuring the precise styloid process length using three dimensional (3D) reconstruction images.[8].

Eagle's syndrome can be treated surgically and non-surgically. Surgical treatment has two approaches transoral and external (transcervical) approach. Advantages of the transoral approach are safety, simpleness, shorter time, and no external scar, even though such approach has been criticized by some authors in view of the possibility of DNSI infection of deep neck spaces, the risk of injury to major vessels, nerves and surrounding structures due to the poor visualization of deep planes. While the disadvantages of the external approach are the external scar, wound infection, the longer surgical time and the risk of injury to the terminal branches of facial nerve<sup>(10)</sup>.

### ***Conclusion:***

Awareness of Eagle syndrome is important to all health practitioners involved in the diagnosis and management of neck and head pain. It can be confused with many other conditions that must be excluded. Diagnosis of ES can be made by physical examination and radiological investigations. Surgical resection of the elongated styloid process is the treatment of choice.

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**متلازمة إيجل: سبب غير معهود لوجع الرقبة المتكرر خلف الحنك**

## الملخص:

تحدث متلازمة إيجل بسبب استطالة النتوء الإبري العظمي أو تكلس الرباط اللامي في العنق، مسببة أوجاعاً متكررة في الحلق أو الشعور بوجود جسم غريب، مع صعوبة في البلع. بالإضافة إلى أوجاع في الوجه تتجه أحياناً نحو الأذن أو خلف الحنك.

مثل هذه الأعراض من السهل أن تختلط مع أمراض أخرى تسبب نفس الأعراض والشكوى.

تشخيص هذا المرض عادة ما يتم عبر الفحص السريري بجسّ النتوء العظمي داخل حفرة اللوزتين في الحلق. الفحص الشعاعي للرقبة عادة ما يظهر النتوء الإبري الطويل ولكن الأشعة المقطعية للرقبة تبين تفاصيل تشريحية دقيقة عن طول النتوء العظمي ومجاوراته، ما يساعد الجراح عند إجراء العملية.

علاج المرضى عادة ما يتم جراحياً وذلك باستئصال الجزء البارز من النتوء عن طريق الفم أو عن طريق الجراحة الخارجية. نستعرض في هذا التقرير حالة مماثلة لمريض عمره ٣٨ سنة تعرض لاستئصال اللوزتين قبل سنتين من وصوله إلينا في العيادة الاستشارية لمستشفى بابكر الخيري بحضرموت، يشكو من أوجاع في الجهة اليمنى من الرقبة تتجه أحياناً نحو الأذن اليمنى وتزداد عند تحريكه للرقبة إلى الجهة اليسرى.

تبين بالفحص السريري والإشعاعي أن لديه متلازمة إيجل. أجريت للمريض عملية استئصال للجزء الزائد من العظم وأسفرت العملية عن اختفاء الأعراض التي يعاني منها المريض نهائياً.

الوعي بمتلازمة إيجل مهم لكل الأطباء المعنيين بعلاج وتشخيص أمراض وأوجاع الرقبة والحلق نظراً لإمكانية اختلاطها مع جملة من الأمراض التي تسبب نفس الشكوى للمريض.

***Herpes zoster in Al-Kuwait University  
Hospital in Sana'a city Yemen:  
clinical presentation and  
complications.***

***Dr. Mohammad A. Al-Shami (MD)***

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Department of Dermatology - Faculty of Medicine and Health Sciences,  
Sana'a University, Yemen

P.O box: 1950, Mobile: +967-777202646

E-mail: moh.shami@y.net.ye



جامعة الأندلس  
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Alandalus University For Science & Technology

(AUST)

## ***Herpes zoster in Al-Kuwait University Hospital in Sana'a city Yemen: clinical presentation and complications.***

### ***Abstract :***

Herpes zoster (or simply zoster), commonly known as shingles and also known as zona, is a viral disease characterized by a painful skin rash with blisters in a limited area on one side of the body, often in a stripe. The initial infection with varicella zoster virus (VZV) causes the acute (short-lived) illness chickenpox which generally occurs in children and young adults. Once an episode of chickenpox has resolved, the virus is not eliminated from the body but can go on to cause shingles — an illness with very different symptoms — often many years after the initial infection. We undertook this study to know the clinical and morphological characteristics of herpes zoster and its complication in Yemen.

All cases of herpes zoster (HZ) seen in the dermatology clinic at Al-Kuwait University Hospital over a 10 years period (2001-2011) were included in the study. Their diagnoses were based on the clinical presentation. The following parameters were collected and analyzed: age, sex, symptoms, dermatome distribution, complications, and coexisting diseases.

Of 32 749 new cases seen in the dermatology clinic over 10 years, 154 were HZ, with an occurrence of 0.47%. Male to female ratio was 3.1:2 and the age ranged from 12 months to 90 years. The thoracic dermatomes were the most commonly involved in 86 cases (54%) followed by trigeminal in 27 cases (17.5%) and cervical in 24 cases (15.6%); and both body sides involved roughly in equal rates. Bi-dermatomal involvement was seen in 97 (63%) cases, followed by mono-dermatomal in 54 (35%) cases and disseminated in 3 (1.9%) cases. The most common complication of HZ were post herpetic neurologia (12.3%), followed by 3 cases of disseminated HZ, 2 cases of HZ ophthalmic us developed eye complications end with blindness and 2 cases of scars.

Finally, the occurrence of HZ is 0.47% in patients reporting to the dermatology clinic of the hospital. Males are little more affected than females. The thoracic dermatomes are the most frequently involved and post herpetic neuralgia is the most common complication of HZ among Yemeni patients.

Key words: Herpes zoster; Dermatomes, complications, Yemen.

## Introduction

Herpes zoster (or simply zoster), commonly known as shingles and also known as zona, is a viral disease characterized by a painful skin rash with blisters in a limited area on one side of the body, often in a band (1,2). The initial infection with varicella zoster virus (VZV) causes the acute (short-lived) illness chickenpox which generally occurs in children and young adults (3). Once an episode of chickenpox has resolved, the virus is not eliminated from the body but can go on to cause shingles — an illness with very different symptoms — often many years after the initial infection. Herpes zoster is not the same disease as herpes simplex, despite the name similarity; both the varicella zoster virus and herpes simplex virus belong to the same viral subfamily Alphaherpesvirinae (2-4).

The earliest symptoms of herpes zoster, which include headache, fever, and malaise, are nonspecific, and may result in an incorrect diagnosis (2,5). These symptoms are commonly followed by sensations of burning pain, itching, hyperesthesia (oversensitivity), or paresthesia ("pins and needles": tingling, pricking, or numbness) (6). The pain may be mild too extreme in the affected dermatome, with sensations that are often described as stinging, tingling, aching, numbing or throbbing, and can be interspersed with quick stabs of agonizing pain(1,7).Herpes

zoster in children is often painless, but older people are more likely to get zoster as they age, and the disease tends to be more severe (8,9).

During varicella infection, VZV passes from skin lesions into cutaneous sensory nerve endings and ascends up the sensory fibers to the sensory ganglia where it remains in latent stage (2,3,10) On reactivation, it travels back along the sensory afferents to the skin associated with hematogenous dissemination. Depending upon the rapidity of immune response, the presentation may vary from no clinical lesions, to typical zoster, scattered vesicles, zoster sine herpetic or disseminated zoster (6,11,12). Reactivation may be triggered by trauma, sunburn, exhaustion, injection, immunosuppression or irradiation (13).

There have been no studies in the Yemen population addressing the frequency, natural history, the clinical and complications of HZ infections in Yemen. Therefore in this paper retrospective study was used to determine the frequency, natural history, the clinical and serious complications of Herpes Zoster infections among Yemeni patients in Sana'a city, Yemen.

## **Patients and Methods**

### Patients

The study was conducted from the early 2007 to the end of 2011 at the department of dermatology at Al-Kuwait University Hospital, Sana'a University, Sana'a, Yemen. All cases of herpes zoster attending skin OPD and referred cases from other departments were studied. One hundred and fifty four sequential cases of herpes zoster were enrolled. Patient's demographic data, symptoms, location of lesions, risk factors, associated systemic disease and complications were noted in a registers. Diagnosis was established by history and clinical examination, Tzanck smears and skin biopsy wherever required.

### Data analysis

Data were stored and assessed using Epi-info version 5 CDC. Chi-square and Fisher's exact tests were used to test association between the occurrence of symptoms, complications etc. and type of sexes (male/female) and P values <0.05 were considered as significant.

## **Results**

Of 32 749 new cases seen in the dermatology clinic over 5 years, 154 were HZ, with an occurrence of 0.47%. Male to female ratio was 3.1:2 and the age ranged from 12 months to 90 years (table1).

The mean $\pm$ SD age at presentation was 40.2  $\pm$  20.8 years with the range from 1 year to 90 years. Male to female sex ratio was 3.1:2. Seventeen children (11%) were in the age group of 1 - 15 years. In adults, 32 (20.8%) cases were in age group of 16-25 years, 23 (14.9%) cases in age group of 26 - 35 years, 18 (11.7%) cases in age group of 36 - 45 years, 24 (15.6%) cases in age group of 46 - 55 years, 25 (16.2%) cases in age group of 56 - 65 years and 15 (9.7%) cases were above 65 years of age (table1).

Acute HZ was recorded in 23 (14.9%) cases. Most HZ patients were suffered from moderate infection (81 cases – 52.6%) followed by mild infection in 50 (32.5%) cases (table 2).

The duration of diseases among these patients was between two days and 30 days with average (Mean $\pm$ SD) equal to 7.3 $\pm$ 5.9 days. Majority of the cases (83 cases, 54%) presented between 2- 5 days, followed by 49 cases (31.8%) between 6- 10 days, 10 cases (6.5%) between 11- 15 days and 12 cases (7.8%) between >15days(table7).

Most common dermatomes involvement was bi-dermatomes HZ in 97 (63%), followed by mono-dermatomes in 54(35%) cases and multi-dermatomes HZ in three (1.9%) cases. Multi-dermatomal and disseminated herpes zoster was more frequent in females (3.3%) than males (1.1%) (table 3).

Dermatomes involved in herpes zoster: Thoracic dermatome was most commonly involved occurred in 86 (55.8%) cases with roughly equal rate in both sexes. Fifth cranial nerve was more frequently involved in females than males and this finding was statistically significant ( $P<0.05$ ). Cervical and lumbar dermatomes were equally frequently involved in females and males (table 4).As well both side of the body were involved roughly in equal rates (table 5).

Most common complication seen was post herpetic neuralgia (PHN) in 19 (12.3%) cases, scarring in 2 (1.3%) cases, blindness in 2 (1.3%) and disseminated HZ in 3 cases (table 6, 8).

Systemic diseases seen in association with herpes zoster were diabetes mellitus in 3 cases, systemic lupus erythematosus in 3 cases and pemphigus vulgar in 1 case. Most of these cases had multi-dermatomal herpes zoster in which was recorded in one case DM, 1 case of lupus erythematosus (table 9).

## **Discussion**

This study was done to assess the pattern of HZ infections in a sample of 154 Yemeni patients over 5years period and to compare it with previous results from nearby countries and worldwide.

In this study, 32 749 new cases seen in the dermatology clinic over 5 years, 154 were HZ, with an occurrence of 0.47% ; this result is similar to most of other reports from Australia, Asian countries, Canada, UK and the USA (1,7,14). Scott et al. (14) in England and Wales found that 0.5% of the patients attending dermatological clinics were herpes zoster.

Herpes Zoster mainly affects a single dermatome of the skin. It may occur at any age but the vast majority of patients are more than 50 years of age. Herpes zoster is common among immunocompromised persons, so the elderly are at particular risk, because immunocompetence declines with age. Whitley, et al (3) reported that zoster afflicts 20% of general population, during their life time, especially in elderly. In a similar study on herpes zoster the rate of occurrence is in the range at 1.3 to 5 per thousand persons per year, although it may be seen in any age group (3,15), but our study was different from previous studies in which one thirds of the reported cases only occurred in

individuals over fifty years of age and more than 30 percent occur in those under the age of twenty five years (table 1).

The average age at presentation in our study was 40.2 years (table 1) which is a decade less than the findings of Insinga et al. (16) in which the average age at presentation among their HZ patients was 55.7 years (16). In addition 74.7% of our cases were less than 55 years that is much higher than seen in previous studies(1,7,14,15,17).

The latent virus reactivates in a sensory ganglion and tracks down the sensory nerve to the appropriate segment. The lower cervical, thoracic and lumbar posterior root ganglia are most commonly involved. In our study, thoracic dermatome was involved in 86 (55.8%) cases followed by fifth cranial nerve in 26 (16.9%), cervical in 24 (15.6%) cases, lumbar in 14 (9.1%) cases, and sacral in 4 (2.6%) (table 4). This is in contrast to the studies by Insinga et al. (16), Edmunds et al. (14) and de Melker et al. (17) where dermatomes most commonly involved were thoracic in 35 to 45% and cervical in 20 to 25% while lumbar, fifth cranial nerve and sacral were rarely involved.

Localized dermatomal zoster was seen in 54 (35%) cases, multi-dermatomal zoster in 3 (1.9) cases and disseminated zoster in 3 (1.9) case. Our result is similar to that reported by Edmunds et al. in England and Wales and de Melker et al. in the

Netherlands (14,17). Multi-dermatomal and disseminated zoster was more frequent in females than males and this finding was statistically significant ( $p < 0.05$ ). Gatti et al. (18) had reported that multi-dermatomal and disseminated zoster was more frequent in females than males and this might be female patients are likely to have lower levels of VZV antibodies than male patients. Steiner et al. (19) in their study herpes zoster patients, found that multi-dermatomal and disseminated zoster was more frequent in females than males (ratio 4:1).

The average duration of herpes zoster infection among our Yemeni patients was 7.3 days for all, and it was slightly longer for female patients (8.3 days) than male (6.8days) (table 7). Thomas et al. (20) in their study found that the duration of zoster was longer than in our study (average=14 days) and patients were more likely to have more complications, severe cases (21%), ophthalmologic HZ (3%), bacterial super infection (15%) and more than one dermatome (38%) affected.

Post herpetic neuralgia was the most common and important complication of herpes zoster infection in our study in which 12.3% of total patients developed post herpetic neuralgia with significant increase of occurrence in females 16.7% comparing with 9.6% in male ( $P < 0.05$ ) (table 6,8). Our result is similar to that reported worldwide in which post herpetic neuralgia is the

most common and important complication of herpes zoster infection and most patients experience severe constant pain at the site of the lesion but it usually remits within 2 to 3 weeks. However, in some patients, a chronic disabling neuralgia occurs. Most of these patients (80%) improve and recover over one year. In others, the pain is so severe and unremitting that it may lead to suicidal tendencies (12,18,21-24). In addition disseminated herpes zoster occurred in three cases in our study as we know disseminated zoster is much more likely to occur in immunocompromised individuals. The patient is likely to be extremely ill, often with visceral involvement but the outcome is rarely fatal (9,13). The presentation of ophthalmic zoster is complex because many structures of the eye can be involved i.e. the eyelid, conjunctiva, sclera, cornea and iris (25). Unfortunately, blindness following herpes zoster in our study occurred in 2 cases while blindness following herpes zoster is rare elsewhere (6,15, 16,25). Interior uveitis and keratitis are the most common intraocular complications. Sight threatening complications include neuropathic keratitis, perforation, secondary glaucoma, posterior scleritis, optic neuritis and acute retinal necrosis (25).

### **Conclusions**

To conclude, herpes zoster commonly occurs in young adults in Yemen with moderate and mild symptoms. Most common dermatomes involvements were bi-dermatomes HZ and mono-dermatomes HZ while multi-dermatomes was rare. The occurrence of crusted and ulcerated lesions (scarring) is possible in herpes zoster. Thoracic dermatome was most frequently involved dermatome. Amongst our patients, multi-dermatomal, recurrent and disseminated zoster may occur.

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Table 1: The age groups and sex distribution of herpes zoster patients in Al-Kuwait University hospitals, Sana'a, Yemen

Age groups	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
1-15 yrs	6	6.4	11	18.3	17	11	NS
16-25 yrs	24	25.5	8	13.3	32	20.8	NS
26-35 yrs	16	17	7	11.7	23	14.9	NS
36-45 yrs	9	9.6	9	15	18	11.7	NS
46-55 yrs	14	14.9	10	16.7	24	15.6	NS
56-65 yrs	14	14.9	11	18.3	25	16.2	NS
>65 yrs	11	11.7	4	6.7	15	9.7	NS
Mean age	40.5 years		39.8 years		40.2 years		
SD	20.8 years		21 years		20.8 years		
Mode	20 years		65 years		50 years		
Median	36.5 years		45 years		40 years		
Min	6 years		1 years		1 years		
Max	90 years		80 years		90 years		

Table 2: The degree of severity of herpes zoster infection in different sexes

Degrees	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
Mild	30	31.9	20	33.3	50	32.5	NS
Moderate	51	54.3	30	50	81	52.6	NS
Sever	13	13.8	10	16.7	23	14.9	NS
Total	94	61	60	39	154	100	<0.05

Table 3: The dermatomes involvement in herpes zoster infections among our patients

Characters	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
Mono-dermatomes HZ	35	37.2	19	31.7	54	35	NS
Bi- dermatomes HZ	58	61.7	39	65	97	63	NS
Multi-dermatomes HZ	1	1.1	2	3.3	3	1.9	NS
Total	94	61	60	39	154	100	<0.05

Table 4: The sites of dermatomes involved herpes zoster infection among Yemeni patients

Sites	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
Thoracic	54	57.4	32	53.3	86	55.8	NS
Cervical	15	16	9	15	24	15.6	NS
Fifth cranial nerve	14	15	12	20	26	16.9	<0.05
Lumber	8	8.5	6	10	14	9.1	<0.05
Sacral	3	3.2	1	1.7	4	2.6	NS

Table 5: The body side involved herpes zoster infection among Yemeni patients

Sides involved	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
Right side	54	57.4	26	43.3	80	51.9	NS
Left side	40	42.6	34	56.7	74	48.1	NS
Total	94	61	60	39	154	100	NS

Table 6: The prognosis of herpes zoster infection to post herpetic neuralgia among Yemeni patients

Sites	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
Post herpetic <50	2	2.1	5	8.3	7	4.5	< 0.05
Post herpetic >50	7	7.8	5	8.3	12	7.8	NS
Total	9	9.6	10	16.7	19	12.3	< 0.05

Table 7: The duration of herpes zoster infection among Yemeni patients

Duration	Male n=94		Female n=60		Total n=154		p-value
	No	%	No	%	No	%	
2-5 days	53	56.4	30	50	83	54	NS
6-10 days	30	32	19	31.7	49	31.8	NS
11-15 days	5	5.3	5	8.3	10	6.5	NS
> 15 days	6	6.4	6	10	12	7.8	NS
Mean	6.8 days		8.3 days		7.3 days		
SD	5.2 days		6.8 days		5.9 days		
Min-Max	2 – 30 days		2 -30 days		2 -30 days		

Table 8: The most common complication involved herpes zoster infection among Yemeni patients

Complications	Male n=94		Female n=60		Total n=154		p- value
	No	%	No	%	No	%	
Disseminated HZ	1	1.1	2	3.3	3	2	NS
Blindness	0	0	2	3.3	2	1.3	<0.05
Scarring	0	0	2	3.3	2	1.3	<0.05
Post herpetic neuralgia	9	9.6	10	16.7	19	12.3	<0.05

Table 9: Systemic diseases associated with herpes zoster infection among Yemeni patients

Diseases	Male n=94		Female n=60		Total n=154		p- value
	No	%	No	%	No	%	
Diabetes mellitus	2	2.1	1	1.7	3	2	NS
SLE	2	2.1	1	1.7	3	2	NS
Pemphigus vulgars	1	1.1	0	0	1	0.6	NS

*Risk factors and Clinical  
Presentation of Stroke in Mukalla,  
Hadhramout, Republic of Yemen*

***Rasheed Mohammed Bamekhlah***

***Abdullah Saleh Bin-Nabhan***

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Department of Medicine, College of medicine and medical sciences (HUCOM), Hadhramout University of Science and Technology.

***Nabeel Salim Musaian***

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Department of Family Medicine, College of medicine and medical sciences (HUCOM), Hadhramout University of Science and Technology.



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العلوم والتقنية

Alandalus University For Science & Technology

(AUST)

## Risk factors and Clinical Presentation of Stroke in Mukalla, Hadhramout, Republic of Yemen

### **Abstract:**

**Background:** Stroke is the third leading cause of death (after heart disease and cancer), and a major cause of long-term disability among survivors. Our country is lacking studies about stroke. Our study aim was to identify the risk factors, clinical presentation and outcome of stroke in our region Hadhramout, Republic of Yemen.

**Patients and Methods:** a retrospective cross-sectional study of stroke patients admitted at Ibnseena Teaching Hospital at Mukalla, Hadhramout, Yemen during the period January 2009-December 2010. Data were collected in a questionnaire from the patients' medical files.

**Results:** there were 774 stroke cases during the study period with age mean of  $(69\pm 13.3)$  years; ischemic stroke represented 82.9% and the hemorrhagic type 17.1%. Males were 55.8%. Hypertension was the most common risk factor (57.2%) of cases, followed by diabetes mellitus (44.8%), smoking (20.9%) family history (13.4%), previous attack (10.6%) and dyslipidemia (8.7%). In 4.7% of cases there was no risk factors, 24.5% with one and 70.8% were with  $\geq 2$  risk factors. About 75% sake hospital within 24 hours, 90.6% with sudden onset, 61.4% were fully conscious and 38.6% with disturbed consciousness, 22.7% were confused and 15.9% were comatose. Dysphasia was in 31.8%. In-hospital death was 33.6% of cases. About one third of cases died in hospital.

Conclusions:stroke was slightly higher in males than females. Hypertension, diabetes mellitus and smoking were the most common risk factors, while dyslipidemia the least. In-hospital mortality was high and represented one third of cases. (Key words: stroke, cerebrovascular, CVA,)

### ***Introduction:***

Cerebrovascular accident (CVA) or stroke is defined as a rapidly developed global or focal neurological deficit lasting more than 24 hours or leading to death with no apparent cause other than vascular origin. (1). It is a common neurological disorder and is the third leading cause of death (after heart disease and cancer) (2), and a major cause of long-term disability among survivors (2, 3).

Stroke has many risk factors including: increasing age , male sex (4), hypertension (5), diabetes mellitus (6), smoking (7), hyperlipidaemia (8), previous attacks and family history (9).

Stroke can be either due to thrombo-embolic cause which leads to ischemia and cerebral infarction or bleeding leading to cerebral hemorrhage (10)

There are no data about the risk factors, types or clinical presentation in our region Hadhramout, Republic of Yemen. So our research aimed to determine the risk factors and clinical patterns of CVA in Ibnseena Hospital, Mukalla, Hadhramout.

### ***Subjects and Methods:***

This was a retrospective study of patients with CVA admitted in the medical ward at Ibn-seena Hospital, Mukalla, Hadhramout during the period between January 1<sup>st</sup>. 2009 and December 31<sup>st</sup>. 2010. Data were collected in a questionnaire from patient medical files. The questionnaire involved risk factors (age, sex, hypertension, diabetes mellitus, hyperlipidemia, smoking, previous attacks and family history), type of stroke, timing of hospital seeking, clinical presentation at admission and hospital outcome of submitted cases.

Inclusion Criteria: all patients admitted to the medical department at Ibnseena Hospital Mukalla Hadhramout under the diagnosis of CVA (stroke), ischemic and hemorrhagic, between January 1<sup>st</sup>. 2009 to December 31<sup>st</sup>. 2010.

For statistical analysis of the results, statistical package SPSS version 14 was used. Data is presented in Mean±SD and frequency.

### ***Results:***

Table (1) shows that, patients with CVA admitted to the Medical department at Ibnseena Hospital Mukalla Hadhramout between January 1<sup>st</sup>. 2009 and December 31<sup>st</sup>. 2010 were (774) cases, affected males were more than females (55.8% versus 44.2%) but with no significant difference. Ages were ranged (36-102) years, and mean (69.5±14.36) years. Age didn't show any significant difference between males and female patients although females were older than males (71 ± 12 versus 68 ± 15.8) years.

Figure 1 shows that most patients were elderly >60 years (73.9%), 25.1% of cases were middle-aged 40-60 years, while young cases <40 years accounted 1% only.

Table (2) shows that most patients were >60 years (73.9%), 25.1% of cases were middle-aged 40-60 years, while young cases <40 years accounted 1% only.

Hypertension was the most common risk factor (57.2%) followed by diabetes mellitus (44.8%) while the previous attack was the least common (1.2%) followed by hyperlipidaemia (2.5%). 4.7% of patients had no risk factors, 24.5% with one risk factors and 70.8% had two factors or more and the last group was significantly higher than both other groups, either separately or together (Table 3).

Clinically, Ischaemic CVA was more common (82.9%) than haemorrhagic type (17.1%). Sudden onset of the presentation was more common than gradual onset (90.6% and 9.4%) respectively. Left and right hemiplegia or hemiparesis accounted 55.7% and 44.3% respectively. Most cases (61.4%) reached hospital fully conscious, 22.7% with confusion and only 15.9% were in deep coma. Dysphasia appeared in 31.8% of cases. While 74.8% of cases sake hospital within 24 hours, 25.2% of them sake it after 24 hours as shown in table (4).

Table (1) General data of stroke patients admitted to Ibnseena Hospital Mukalla, Hadhramout, 2009-2010

	Males		Females		Total N=774	
No. of Patients	432	55.8%	342	44.2%	774	100%
Age (in years)						
• Range	36-102		44-96		36-102	
• Mean $\pm$ SD*	68 $\pm$ 15.8		71 $\pm$ 12		69 $\pm$ 13.3	

\*SD Standard deviation

Figure (1): age groups of CVA patients admitted to Ibnseena Hospital Mukalla, Hadhramout, 2009-2010

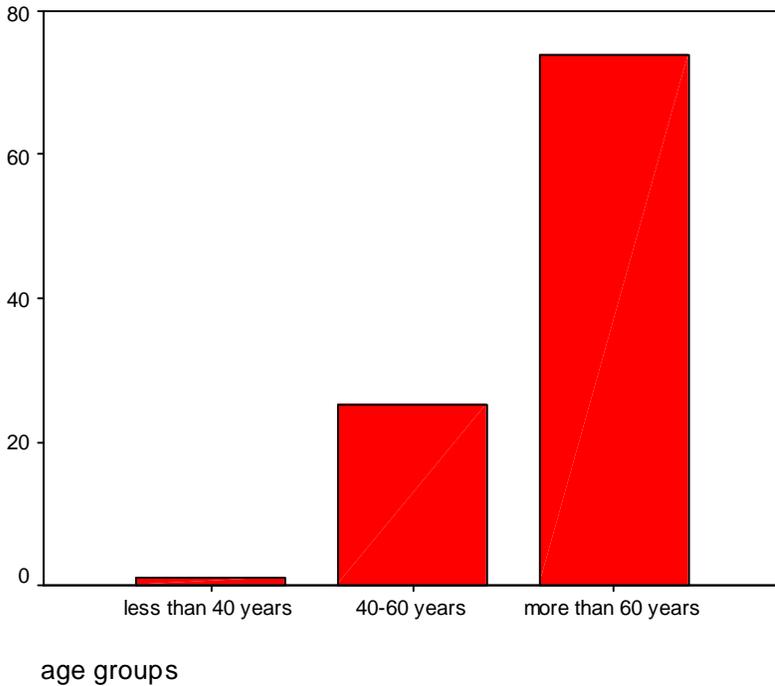


Table (2) Risk factors in Stroke patients admitted in Ibnseena Hospital Mukalla, Hadhramout, 2009-2010

Risk factor		No of patients	
		N= 774	%
Hypertension	Hypertensive	443	57.2
Diabetes mellitus	Diabetics	347	44.8
Family history	Positive	104	13.4
Smoking	Smokers	162	20.9
Hyperlipidemia	Hyperlipidemic	67	8.7
Previous attacks	positive	82	10.6
No. of risk factors	No factor	36	4.7
	One factor	190	24.5
	≥Two factor	548	70.8
Total		774	100

Table (3) Clinical Data of stroke patients admitted in Ibnseena Hospital Mukalla, Hadhramout, 2009-2010

Item		No of patients	
		N= 774	%
Timing of hospitalization	Within 24 hours	579	74.8
	After 24 hours	195	25.5
Type of stroke	Ischaemic	642	82.9
	Hemorrhagic	132	17.1
Onset	Sudden	701	90.6
	Gradual	73	9.4
Hemiplegia (paresis)	Left side	431	55.7
	Right side	343	44.3
Consciousness	Full conscious	475	61.4
	confusion	176	22.7
	Coma	123	15.9
Speech	Motor dysphasia	246	31.8
Total		774	100

Table (4) Comparison between Stroke types in patients at Ibnseena Hospital Mukalla, Hadhramout, 2009-2010

Risk factor N= 774		Ischaemic type No (%in the type)	Haemorrhagi c type No (% in the type)
Age group (years)	<40	8(1.3%)	0 (0%)
	40-60	135 (21%)	59 (44.7%)
	>60	499 (77.7%)*	73 (55.3%)
sex	Male	353 (55%)	79 (59.8%)
	female	289 (45%)	53 (40.2%)
Hypertension	Hypertensive	313 (48.6%)	132 (100%)
Diabetes mellitus	Diabetics	284 (44.2%)	63 (47.7%)
Family history	Positive	97 (15.1%)	7 (5.3%)
Smoking	Smokers	121 (18.8%)	41 (31.1%)
Hyperlipidemia	Hyperlipidem ic	53 (8.3%)	14 (10.6%)
Previous attacks	positive	82 (12.7%)	0 (0%)
No. of risk factors	No factor	36 (6.5%)	0 (0%)
	One factor	156 (24.3%)	34 (25.8%)
	≥Two factor	450 (70.1%)	98 (74.2%)
Consciousness level	Full conscious	446(69.5%)	29 (22%)
	Confusion	112 (17.5%)	64 (48.5%)
	coma	84 (13.1%)	39 (29.5%)
Total	N= 774	642	132

\*p value <0.001

\*\*p value <0.0001

### ***Discussion:***

Our study revealed that males were more affected than females which supports results from different regions in the world[(9), (11),(12), (13), (14)]. But in Africa, namely in Nigeria, the opposite was seen [(15), (16)] and this may be attributable to ethnic difference, Connor, et al.; (2009) in South Africa realized that stroke was common in white males than females and in black females than males (17) and the same findings were reported in United Kingdom by Hajat et al (2001) (18).

The mean age in our study was in the seven decade and this was consistent with a lot of works [(9), (14), (15), (16)]. Elderly people were the most common age group affected in comparison with younger and middle-aged group, the same findings were revealed by many studies [(12), (13), (14), (16)].

Our study showed that hypertension was the most common modifiable risk factor of stroke (57.5%), earlier studies found that was ranging between 51% and 66% [(9) (12), (14), (18), (19), (20)]. Although in Iraq, Awad, et al.; (2010) (21) and in Iran Delbari, et al.; (2011) (22) found higher figures than the range (69% and 74.6% respectively). More recently, Tran and Mirzaei (2011)(23) realized that up to 60% of stroke in The

middle East and North Africa can be attributable to hypertension which was in the range of our study finding.

The second common risk factor found in our study was diabetes mellitus (44.8%), which was near to many studies done in Arab countries, in Saudi Arabia 37% (24), Iraq 41% (21), in Qatar 42% (25), and in Libya 44% (26), in Iran and Turkey it was ranged between 30-36% [(20), (27)], but in Italy it was 20% (28) and whole Europe 15.9% only (19), these may be attributable to lack of better glycemic control due to society and individual unawareness and / or poor primary health care in our country.

Smoking was the third common risk factor of stroke; it accounted 20.9% of patients, many studies agreed with this findings in which the range was 17-25% [(9) (11) (16) (18) (19)].

Hyperlipidemia was also a risk factor of stroke in our study, but reported in 8.7% of patients only, and this agreed with Bornstein, et al.; (1996) (31), but Qari, (2000) in Saudi Arabia (9) and Desalu, et al.; in Nigeria (2011) (16) found lower figures (4% and 3% respectively) while in Iran, Ahangar et al.; (2005) (30), Azarpazhooh, et al.; (2010) (12) and Delbari, et al.; (2010) (20) reported higher figures (26%, 25% and 31%

respectively) and this may be due ethnic, dietary and social factors,

We found that there was 10.6% of patients had a history of previous stroke attack, which was agreed by many studies ranging between 7.4% and 13% [(31), (32), (33)].

Family history of stroke was one of the risk factors in our study as it appeared in 13.4% of patients, which is consistent with many studies [(31), (32), (33)].

In our study, 70.8% of patients were with  $\geq 2$  risk factors which was agreed with Awad et al.; (2010) (21), Desalu, et al.; (2011) (16) and Itrat, et al.; (2011) (34).

Also we found that most of cases were of ischemic stroke (82.9%) comparing to the hemorrhagic type (17.1%) which supports studies world-wide whose ranges were 80-89% for ischemic stroke and 11-20% for the hemorrhagic one [(9), (12), (14), (21)]. The onset of the disease in our study was (90.6%) which was consistent with Ghandari and Izadi-Mood (2007) (87.9%) (34). We found that 38.6% of cases presented with disturbed consciousness; and dysphasia appeared in our study in 31.8% of them which is agreed with a study done in Saudi Arabia by Qari (2000) (37.5% and 32% respectively) (9)

In-hospital mortality was 33.6%, Although Qari (2000) Saudi Arabia (9) and Ahangar et al. (2005) in Iran (30) showed similar figures, El-syed et al. (1999) in Saudi Arabia (32), Ghandehari and Izadi-Mood (2007) in Iran (35) and Khan et al. (2008) (36) in Qatar noted lower findings (10%, 7.3% and 9.3% respectively). Our higher mortality reflects the level of health care system as well as the lack of well-structured health education to fight risk factors.

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## عوامل الخطورة والعرض السريري للصدمة الدماغية الوعائية

### في المكلا حضرموت

رشيد محمد بامخلاة ❖ عبد الله صالح بن نبهان ❖ نبيل سالم مسيعان ❖

❖ قسم الأمراض الباطنة - كلية الطب والعلوم الصحية - جامعة حضرموت للعلوم والتكنولوجيا

❖ قسم طب الأسرة - كلية الطب والعلوم الصحية - جامعة حضرموت للعلوم والتكنولوجيا

### الملخص العربي :

تعتبر الصدمة الدماغية الوعائية ثالث أسباب الوفاة بعد أمراض القلب والسرطانات، وهي أيضاً سبب من أسباب الإعاقة المزمنة. وبلادنا تفتقر إلى الدراسات حول هذا المرض. هدفت الدراسة إلى معرفة عوامل الخطورة التي من الممكن أن تؤدي إلى الإصابة بهذا المرض وكيف يكون العرض السريري له.

تصميم الدراسة : دراسة وصفية لحالات الصدمة الدماغية الوعائية التي تم إدخالها مستشفى بن سينا بالمكلا حضرموت خلال الفترة بين ١ يناير ٢٠٠٩م و٣١ ديسمبر ٢٠١٠م، وتم تجميع البيانات المطلوبة من الأرشيف الخاص بملفات المرضى بالمستشفى. النتائج: خلال الفترة المحددة في الدراسة تم إدخال ٧٧٤ حالة الى المستشفى بعمر متوسط ٦٩ ± ١٣.٣ عاما وشكل النوع الفقاري منها ٨٢.٩% والنزفي ١٧.١%. كان الرجل من الحالات ٥٥%. أكثر عوامل الخطورة هو ارتفاع ضغط الدم (٥٧.٢%) يليه داء السكري (٤٤.٨%) ثم التدخين (٢٠.٩%) والتاريخي العائلي (١٣.٤%) التعرض السابق للمرض (١٠.٦%) وارتفاع الكوليسترول (٨.٧%). في ٤.٧% من الحالات لا يوجد أي عامل خطورة بينما ٢٤.٥% منهم لديهم عامل خطورة واحد والغالبية (٧٠.٨%) يحملون أكثر من عامل للخطورة. حوالي ٧٥% وصلوا إلى المستشفى خلال ٢٤ ساعة من حدوث المرض، حوالي ٩٠% كان تطور المرض فجائي، ٦١.٤% بكامل وعيهم، و٣٨.٦% بوعي متأثر (منهم ١٥.٩% في غيبوبة). تأثير الكلام كان في ١.٨%. أما الوفيات داخل المستشفى فقد كان ٣٣.٦% من الحالات .

الاستنتاجات: الصدمة الدماغية الوعائية أكثر عند الرجال مقارنة بالنساء. ارتفاع ضغط الدم وداء السكري والتدخين هي أكثر عوامل الخطورة التي تؤدي إليها. بينما ازدياد نسبة الدهون أقلها. الوفيات شكلت حوالي ثلث الحالات.

*Prevalence of Staphylococcus aureus  
infection among diabetic foot  
patients in Sana'a city-Yemen*

**Khaled A. Al-Moyed**

Department of Medical Microbiology, Faculty of Medicine and Health  
Sciences, Sana'a University, Yemen.

P.O. Box 1610

E mail: khalmoy@y.net.ye

Phone: +967-1-561400 or Mobile: +967-711100620

**Ahmed M. Al-Haddad**

Department of Basic Medical Sciences, College of Medicine and Health  
Sciences, Hadhramout University, Yemen.

**Badie A. Al-Areqi**

Department of Microbiology, Faculty of Science, Ibb University, Yemen.

**Dheya A. Al-Danani**

Department of Medical Microbiology, Faculty of Medicine and Health  
Sciences, Sana'a University, Yemen.



جامعة الأندلس  
العلوم والتقنية

Alandalus University For Science & Technology

(AUST)

## ***Prevalence of Staphylococcus aureus infection among diabetic foot patients in Sana'a city-Yemen***

### ***Abstract***

Diabetes mellitus is a progressive disease with chronic complications. Foot infections are a frequent complication for diabetic patients. The infection with *Staphylococcus aureus* in the diabetic foot accelerate the inflammatory process, endothelial injury and blood coagulation, ultimately lead to a faster death. The aim of this study was, firstly to determine the prevalence of *S. aureus* among diabetic foot patients, secondly to identify the predisposing factors associated with *S. aureus* infection and diabetic foot, and thirdly to determine the antibiotics that are effective against *S. aureus* isolates.

This was a case-finding study which included 93 of diabetic foot patients of whom 66 were males and 27 were females. Their age ranged from 16 to  $\geq 76$  years old, with a mean age of 60.5 years. These patients sought medical attention for different diabetic foot infections at Al-Thawra General Hospital, Al-Gumhouri Teaching Hospital and Azal Specialized Hospital in Sana'a city, Yemen during the period, starting in December 2008 and ending in November 2009. A swab was collected from each infected diabetic foot patient and cultured for *S. aureus* using standard bacteriological procedures.

*S. aureus* was isolated from 56% of the total diabetic foot patients, among these isolates, MRSA represented 55.8% and VRSA 9.6%. Regarding the predisposing factors for the studied patients, hypertension and peripheral neuropathy represented 30.1% and 32.2%, but these results were not statistically significant in term of the patients and *S. aureus* infections with a relative risk for peripheral vascular disease patients who were one and half time more at risk than the others in contracting *S.*

aureus. As regards the antibiotics tested in this study, the efficacy of these antibiotics against *S. aureus* isolates is shown in the following order; imipenem (98.1%), cefepime (96.2%), vancomycin (90.4%), rifampicin (86.5%), ceftriaxone (73.1%), gentamicin (67.3%), clindamycin (67.3%), ciprofloxacin (65.4%), fusidic acid (63.5%), erythromycin (63.5%), tetracycline (55.8%), methicillin (44.2%), oxacillin (44.2%) and augmentin (32.7%). Finally, among all *S. aureus* isolates, 63.5% were multi-drug resistant and among all MRSA isolates, 69% were also multi-drug resistant.

Further studies are recommended to determine all the etiological agents that infect the diabetic foot other than *S. aureus*, especially for the rest governorates of the country and the periodical testing of more recent antibiotics for accurate susceptibility and therapy.

## **Introduction:**

*Staphylococcus aureus* (*S. aureus*) is by far the most important human pathogen among the staphylococci. It is found in the external environment and in the anterior nares of 20-40% of adults. Other sites of colonization include intertriginous skin folds, the perineum, the axillae and the vagina. Although this organism is frequently a part of the normal human microflora, it can cause significant opportunistic infections under the appropriate conditions.<sup>1</sup>

*S. aureus* is an opportunistic pathogen that causes a broad range of human infections such as food poisoning, pneumonia, meningitis, skin infections, arthritis, osteomyelitis, endocarditis, and toxic shock syndrome.<sup>2</sup>

*S. aureus* has three features that make it distinct among most other clinically important bacteria. It can express a variety of virulence factors, it has the ability to develop and expand resistance to a broad spectrum of antimicrobial drug classes, and it is prominent in both hospital and community settings. These diverse features contribute to its pathogenicity and help to define the host-microbe interaction.<sup>3,4</sup>

Foot infections are a major cause of morbidity in patients with diabetes worldwide. They occur in up to 15% of diabetic patients and account for 20% of all hospitalizations of diabetic patients.<sup>5</sup> Contributory factors include peripheral neuropathy, vascular disease, pedal deformities and local trauma and pressure. Diabetic foot infections (DFIs) are in turn an important risk factor for amputation, accounting for approximately two-thirds of lower-extremity amputations in diabetics<sup>6</sup>. Prompt institution of effective antimicrobial therapy for DFI should help reduce morbidity.<sup>7</sup> However, there is a lack of good-quality evidence of clinical efficacy and cost effectiveness to guide the choice of antimicrobial therapy. The choice of therapy is

becoming increasingly complex, driven both by increasing antibiotic resistance in the pathogens isolated from DFI<sup>8</sup> and an increasing number of new or forthcoming antibiotics licensed for treating skin and skin-structure infections (SSSIs).<sup>9</sup>

The infections with *S. aureus* in the diabetic foot accelerated the inflammatory process, endothelial injury, and blood coagulation, ultimately leading to a quicker death.<sup>10</sup>

#### Patients, Materials and Methods

This case-finding study included 93 diabetic foot patients of whom 66 were males and 27 were females. Their age ranged from 16 to  $\geq 76$  years old, with a mean age of 60.5 years. These sought medical attention for different diabetic foot infections at Al-Thawra General Hospital, Al-Gumhouri Teaching Hospital and Azal Specialized Hospital in Sana'a city, Yemen, during a ~ 1 year period starting in December 2008 and ending in November 2009. A questionnaire for each patient was filled with the patient's personal and clinical information. This included the age, gender, occupation, diabetes duration, type of diabetes and the relevant clinical information regarding the diabetic foot infection. Peripheral sensory neuropathy was considered present if three or more sensory modalities were absent.<sup>11</sup> Peripheral vascular disease (PVD) was diagnosed if both foot pulses (dorsalis pedis and posterior tibialis) were absent on palpation from the ulcer-affected limb. Neuro-ischaemic ulceration was diagnosed if criteria for both PVD and sensory neuropathy were met.

All specimens collected by Dacron swabs from the site of diabetic foot infections were either put into transport medium for cultured later or directly cultured on mannitol salt agar (selective medium), then processed by using culture standardized methods and incubated aerobically at 35-37°C for 24-48 hrs.<sup>12</sup> All *S. aureus* isolates were identified primarily by routine laboratory procedures. Gram-positive, catalase-positive colonies were tested for mannitol fermentation. clumping factor was detected by

using rabbit plasma. Organisms were confirmed as *S. aureus* by the tube coagulase test and the DNase test. *S. aureus* isolates were tested for antibiotics susceptibility by the Kirby-Bauer disc diffusion method using discs on Mueller-Hinton agar supplemented with 4% NaCl and incubated at 35 °C for 24 hrs. The antibiotic discs that were used in the antibiogram were augmentin, cefepime, ceftriaxone, ciprofloxacin, clindamycin, erythromycin, fusidic acid, gentamicin, imipenem, methicillin, oxacillin, rifampicin, tetracycline and vancomycin. Bacterial growth inhibition zones (mm) in diameter were measured according to the disc manufacturer's instructions.

The clinical and personal data in addition to the results of culture for each specimen were entered into a questionnaire and analyzed by the Epi Info, version 6, 2004, CDC. The significance of difference in proportion was analyzed by Pearson Chi-square ( $\chi^2$ ) which equal to or greater than 3.84, probability value (p) which equal to or less than 0.05 was considered as statistically significant.

## Results:

Table 1: The number and percentage of *S. aureus* and other isolates in respect to total studied patients with diabetic foot infection

Culture results	Total examined patients	
	No.	%
<i>S. aureus</i>	52	56.0
CONS*	22	23.6
No growth	19	20.4
Total	93	100.0

\*CONS: Coagulase negative *Staphylococcus*.

Table 1 shows the number and percentage of *S. aureus* and other isolates in respect to the total studied patients with diabetic foot infection. Accordingly, 52 (56%) of patients were *S. aureus* positive, 22 (23.6%) of patients were CONS positive and the remaining 19 (20.4) of patients had no growth. It clear from this that the infection with *S. aureus* was high in comparison with the other *Staphylococcus* spp which were remarkably low.

Table 2: The number and percentage of isolated *S. aureus* in respect to the gender of patients with diabetic foot infection

Gender	Total		+ve <i>S. aureus</i>		RR	CI	$\chi^2$	p
	No.	%	No.	%				
Male	66	71.0	37	56.1	1.1	0.7-1.6	0.05	0.82
Female	27	29.0	15	55.5	0.99	0.7-1.5	ND	0.96
Total	93	100.0	52	55.9	-	-	-	-

Table 2 shows the number and percentage of isolated *S. aureus* in respect to the gender of patients with diabetic foot infection. Out of the 66 (71%) males, 37 (56.1%) were positive with *S. aureus*. Regarding the remaining 27 (29%) females, 15 (55.5%) were positive with *S. aureus*. These results were not statistically significant.

Table 3: The number and percentage of isolated *S. aureus* in respect to age of the patients with diabetic foot infection

Age [years]	Total		+ve <i>S. aureus</i>		RR	CI	$\chi^2$	p
	No.	%	No.	%				
16-35	6	6.5	4	66.6	1.2	0.7-2.2	0.3	0.6
36-55	25	26.9	16	64.0	1.2	0.84-1.75	0.91	0.34
56-75	53	57.0	26	49.0	0.75	0.5-1.1	2.35	0.12
≥ 76	9	9.6	6	66.6	1.2	0.74-2.01	0.5	0.49
Total	93	100	52	55.9	-	-	-	-

Table 3 shows the number and percentage of isolated *S. aureus* in respect to age of patients with diabetic foot infection. Out of the 6 (6.5%) patients in the age group from 16 to 35 years, *S. aureus* was positive in 4 (66.6%) of these patients. Out of the 25 (26.9%) patients in the age group from 36 to 55 years, *S. aureus* was positive in 16 (64%) of these patients. Out of the 53 (57%) patients in the age group from 56 to 75 years, *S. aureus* was positive in 26 (49%) of these patients. Out of the 9 (9.6%) patients in the age group from  $\geq 76$  years, *S. aureus* was positive in 6 (66.6%) of these patients. These results were also not statistically significant.

Table 4: The number and percentage of isolated MRSA from the total positive *S. aureus* in respect to the gender of patients with diabetic foot infection

Gender	Total <i>S. aureus</i>		MRSA*		RR	CI	$\chi^2$	p
	No.	%	No.	%				
Male	37	71.1	20	54.0	0.9	0.54-1.5	0.15	0.69
Female	15	28.9	9	60.0	1.1	0.7-1.85	0.15	0.7
Total	52	100.0	29	55.8	-	-	-	-

\*MRSA: Methicillin-resistant *Staphylococcus aureus*.

Table 4 shows the number and percentage of isolated MRSA from the total positive *S. aureus* in respect to the gender of patients with diabetic foot infection. Out of the 37 (71.1%) males, 20 (54%) were positive with MRSA. Regarding the remaining 15 (28.9%) females, 9 (60%) were positive with MRSA. These results were also not statistically significant.

Table 5: The number and percentage of isolated VRSA from the total positive *S. aureus* in respect to the gender of patients with diabetic foot infection

Gender	Total <i>S. aureus</i>		VRSA*		RR	CI	$\chi^2$	p
	No.	%	No.	%				
Male	37	71.1	3	8.1	0.6	0.11-3.3	0.34	0.56
Female	15	28.9	2	13.3	1.64	0.3-8.9	0.34	0.56
Total	52	100.0	5	9.6	-	-	-	-

\*VRSA: Vancomycin-resistant *Staphylococcus aureus*

Table 5 shows the number and percentage of isolated VRSA from the total positive *S. aureus* in respect to the gender of patients with diabetic foot infection. Out of the 37 (71.1%) males, 3 (8.1%) were positive with VRSA. Regarding the remaining 15 (28.9%) females, 2 (13.3%) were positive with VRSA. These results were also not statistically significant. Females were nearly one and half time more at risk than males in contracting VRSA.

Table 6: The prevalence and relative risk of *S. aureus* infection in respect to the risk factors in patients with diabetic foot infection

Risk factors	Total (n=93)		+ve <i>S. aureus</i>		RR	CI	$\chi^2$	P
	No.	%	No.	%				
Hypertension	28	30.1	13	46.4	0.8	0.5-1.2	1.5	0.22
Peripheral neuropathy	30	32.2	16	60.0	0.93	0.63-1.4	0.12	0.72
Peripheral vascular disease	5	5.4	4	80.0	1.5	0.9-2.4	1.24	0.26

Table 6 shows the prevalence and relative risk of *S. aureus* infection in respect to the risk factors in patients with diabetic foot infection. Out of the 28 (30.1%) patients with hypertension,

*S. aureus* was positive in 13 (46.4%) of patients. Out of the 30 (32.2%) patients with peripheral neuropathy, *S. aureus* was positive in 16 (60%) patients, while 5 (5.4%) of patients with peripheral vascular disease, *S. aureus* was positive in 4 (80%) patients. These results were also not statistically significant. Patients with peripheral vascular disease were one and half time more at risk than others in contracting *S. aureus*.

Table 7: The susceptibility patterns of *S. aureus* isolates towards the different commonly used antibiotics

Antibiotics	Susceptibility test					
	Sensitive		Intermediate		Resistant	
	No.	%	No.	%	No.	%
<i>Augmentin (30µg)</i>	17	32.7	-	-	35	67.3
<i>Methicillin (5µg)</i>	17	32.7	6	11.5	29	55.8
<i>Oxacillin (1µg)</i>	17	32.7	6	11.5	29	55.8
<i>Tetracycline (30µg)</i>	21	40.4	8	15.4	23	44.2
<i>Erythromycin (15µg)</i>	22	42.3	11	21.1	19	36.6
<i>Fusidic acid (10µg)</i>	30	57.7	3	5.8	19	36.5
<i>Ciprofloxacin (5µg)</i>	26	50.0	8	15.4	18	34.6
<i>Clindamycin (2µg)</i>	27	51.9	8	15.4	17	32.7
<i>Gentamicin (10µg)</i>	33	63.5	2	3.8	17	32.7
<i>Ceftriaxone (30µg)</i>	34	65.4	4	7.7	14	26.9
<i>Rifampicin (5µg)</i>	41	78.8	4	7.7	7	13.5
<i>Vancomycin (30µg)</i>	47	90.4	-	-	5	9.6
<i>Cefepime (30µg)</i>	40	77.0	10	19.2	2	3.8
<i>Imipenem (10µg)</i>	51	98.1	0	0.0	1	1.9

Table 7 shows the susceptibility patterns of *S. aureus* isolates towards the different commonly used antibiotics. The percentages of antibiotics to which isolated *S. aureus* was

resistant is shown in the following order; augmentin (67.3%), methicillin (55.8%), oxacillin (55.8%), tetracycline (44.2%), erythromycin (36.5%), fusidic acid (36.5%), ciprofloxacin (34.6%), clindamycin (32.7%), gentamicin (32.7%), ceftriaxone (26.9%), rifampicin (13.5%), vancomycin (9.6%), cefepime (3.8%) and imipenem (1.9%).

Table 8: The multi-drug resistance profile of isolated *S. aureus* from diabetic foot patients

No. of antibiotics to which <i>S. aureus</i> was resistant	MDR* <i>S. aureus</i> n=33	
	No.	%
11	4	12.1
10	4	12.1
9	3	9.1
8	2	6.1
7	4	12.1
6	2	6.1
5	1	3.0
4	2	6.1
3	11	33.3

\*MDR: Multi-drug resistant.

Table 8 shows the multi-drug resistant profile of isolated *S. aureus* from diabetic foot patients. Out of the 52 isolated *S. aureus*, MDR *S. aureus* was positive in 33 (63.5%). The number of antibiotics to which isolated *S. aureus* was resistant is shown in the following order: 4 (12.1%) isolates were resistant to 11 different antibiotics, 4 (12.1%) isolates were resistant to 10 different antibiotics, 3 (9.1%) isolates were resistant to 9 different antibiotics, 2 (6.1%) isolates were resistant to 8 different antibiotics, 4 (12.1%) isolates were resistant to 7 different antibiotics, 2 (6.1%) isolates were resistant to 6 different antibiotics, 1 (3.0%) isolate was resistant to 5 different antibiotics, 2 (6.1%) isolates were resistant to 4 different

antibiotics, 11 (33.3%) isolates were resistant to only 3 different antibiotics.

### ***Discussion:***

*S. aureus* is a common cause of diabetic foot ulcers (DFUs) infection. *S. aureus*, either alone or as a component of mixed infections, is the most important pathogen in a diabetic foot infection.<sup>13</sup> Infection with methicillin-resistant *Staphylococcus aureus* (MRSA) is an increasing problem in both hospital and the community.<sup>14,15</sup> MRSA is commonly grown from foot ulcer swabs of diabetic patients.<sup>16</sup>

This is the first study conducted in Yemen to report about the prevalence of *S. aureus* infection among diabetic foot patients.

In the present study the prevalence of *S. aureus* isolated from diabetic foot patients was 56%, this result was higher than that documented in Kuwait (44.2%), UK (42%) and Iran (26.2%),<sup>17,18,19</sup> but consistent to that documented by Slater in 2004, who found that the predominance of *S. aureus* in 50% of diabetic foot patients.<sup>20</sup>

In addition, the prevalence of coagulase negative *Staphylococcus* (CONS) isolates in this study was 23.6%, this result was higher than that documented in Spain (17.2%)<sup>21</sup> and consistent to that stated in India which was 25.9%.<sup>22</sup> The high percentage of *Staphylococcus* species in the present study may be attributed to the majority of diabetic foot infections (DFIs) that were superficial. The same finding was documented in Saudi Arabia, where the majority of DFIs is superficial and are frequently colonized by aerobic gram-positive bacteria.<sup>23</sup>

The cultures which showed no growth in this study were 20.7%, this result was higher than that reported in India (6.4%),<sup>22</sup> but lower than that reported in Spain (30%).<sup>21</sup> There is no clear explanation for the apparent differences in the microbiological

findings between developed and developing countries. The possible reasons may include patients presenting to medical services later in developing countries or the differences in the pattern of wound exposure to microorganisms or may referred to differences in microbiological diagnostic techniques.

Regarding the gender, there was no significant association in the prevalence of isolated *S. aureus* from DFIs, despite the incidence of diabetic foot infections among males was 71% versus 29% in females with a ratio of 2.4:1. This finding was similar to that reported in UK,<sup>19</sup> and other studies that underscored male preponderance for this condition in general. This may indicate a higher level of activity among males compared to females.

Although there was no statistical association between *S. aureus* and the different age groups, the lowest positivity for *S. aureus* was found in the age group (56-75) years old. This variation may be attributed to the large number of patients included in this group who are usually suffering from diabetes mellitus more than other age groups.

In this study, there is no significant association between the MRSA isolates and gender. But the prevalence of MRSA among diabetic foot patients was 31.1% from the total studied patients and 55.8% from the total *S. aureus* isolates, the finding of MRSA in relation to the patients was higher than that documented in UK (15%), France (16%), Kuwait (5.9%), India (10.3%) and UK (19%),<sup>16,17,19, 22,24</sup> but similar to that stated in UK (30%) and Egypt (31.3%).<sup>25,26</sup>

These variations in different countries can be explained by the different patient populations, hospital care practices, infection control activities, time of study and the biological characteristics of the *S. aureus* strains.

Regarding the prevalence of VRSA isolates among diabetic foot patients which yielded a percentage of 5.4% out of the total

studied patients and 9.6% out of the total *S. aureus* isolates. the finding of VRSA in relation to isolated *S. aureus* was higher than that documented in Kuwait and Malaysia which was zero for each,<sup>17,27</sup> but lower than that documented in Iran (63%).<sup>18</sup> Chronic ulcers and vancomycin use place one at risk for emerging VRSA.<sup>28</sup> From the present results, VRSA was 8.1% in males versus 13.3% in females, this variation may be due to the less number of females enrolled in the present study than males.

In this study, as regards the factors that contribute for diabetic foot infections, 30.1% of patients had hypertension, these results were lower than that reported in Kuwait (45.3%) and Nigeria (81.5%).<sup>17,29</sup> In addition, 32.2% of patients had peripheral neuropathy, these results were lower than that reported in UK (55%),<sup>19</sup> but higher than that documented in Spain (26%) and India (27.2%).<sup>21,22</sup> In this study, patients with peripheral vascular disease were 5.4%, this result was lower than that reported in Spain (27%) and India (10.3%).<sup>21,22</sup> The relative risk among patients with peripheral vascular disease was one and half time more at risk than other diabetic foot patients in contracting *S. aureus*. This may referred to the fact that these patients have impaired microvascular circulation which limits the access of phagocytic cells to the infected area and results in a poor concentration of antibiotics in the infected tissues. There was no literature found that correlated these factors with *S. aureus* infection.

The antibiogram results in this study suggested that the antibiotics that remain highly sensitive against *S. aureus* were; imipenem (98.1%), although most other studies used it for the susceptibility testing in gram-negative bacteria only, followed by cefepime (96.2%) which had a high activity against MRSA, this finding differs from a study conducted in Kuwait, which found that the fourth generation of cephalosporin; cefepime lack an adequate activity against MRSA.<sup>17</sup> The highest resistance of antibiotics used in the present study was found in augmentin

(67.3%), this result was higher than that documented in Kuwait 5.9%.<sup>17</sup> The resistant to erythromycin in this study was 36.5%, this finding was higher than that documented in Malaysia (16%),<sup>27</sup> but consistent to that documented in Kuwait (38.2%).<sup>17</sup> In addition, the resistant to gentamycin and fusidic acid in the present study were 32.7% and 36.5%, these results were higher than that documented in Kuwait which were 10% and 11.8% and in Malaysia with percentages of 18% and 7%.<sup>17,27</sup> But the resistant to tetracycline in this study was 44.2%, this result was lower than that documented in Kuwait 67.6%.<sup>17</sup> Moreover the resistant to clindamycin and ceftriaxone in this study was 32.7% and 26.6%, these results were lower than that reported in Iran which were 54 % and 81%.<sup>18</sup> Finally, resistant to oxacillin and rifampicin in this finding were 55.8% and 13.5%, these results were higher than that documented in Malaysia which were 16% and zero.<sup>27</sup>

The antibiotic profile of isolated *S. aureus* in this study revealed that the 63.5% of these isolates were multi-drug resistant. This result was lower than that documented in Nigeria,<sup>29</sup> which found that all *S. aureus* isolates from diabetic foot patients were 100% multi-drug resistant. Out of the 29 MRSA isolates, 20 (69%) were multi-drug resistant. Several reasons may account for the high rate of resistance among *S. aureus* in this study, these include; misuse of antibiotics, prescription of antibiotics without adequate knowledge about infectious diseases and proper antimicrobial usage. Moreover some patients in this study may self-medicated themselves or used local herbs for treatment, thereby tampering with their ulcers before admitting to the hospital which may also explain in part the multi-drug resistant nature of these *S. aureus* isolates. All isolated VRSA had also been resistant to methicillin and oxacillin. Severin and co-workers in 2004 investigated the mechanism of expression of high-level vancomycin resistance using an oxacillin-resistant *S. aureus* strain carrying the *vanA* gene complex and the inactivated *mecA*. They reported that the

key penicillin-binding protein essential for vancomycin resistance and for the altered cell wall composition characteristic of VRSA is PBP2. They also concluded that although *mecA* is essential for methicillin and oxacillin resistance, it is not involved in the expression of vancomycin resistance.<sup>30</sup>

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***Postoperative Morbidity after Anterior  
Septoplasty with versus without Nasal  
Packing;***  
Comparative randomized trial

**Monasar S. Al-Muflahi MD**

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Associate Professor of ENT  
Department of Surgery and surgical specialities  
College of Medicine, Hadhramout University  
Mukalla, Hadhramout, Yemen  
Email: drmonasar@hotmail.com  
Mobile: +967-733250628



جامعة الأندلس  
العلوم والتقنية

Alandalus University For Science & Technology

(AUST)

## *Postoperative Morbidity after Anterior Septoplasty with versus without Nasal Packing ; Comparative randomized trial*

### **Abstract:**

**Objective:** To compare the postoperative morbidity and duration of hospital stay among patients after anterior septoplasty with vs. without nasal packing in Ibn Sina Teaching Hospital and two private polyclinics (Hadhramout Hospital and Al-Madinah Polyclinic) in Mukalla city, Hadhramout, Yemen. **Methods:** A comparative, prospective clinical trial was carried out among patients with anterior deviated nasal septum who had anterior septoplasty performed. One hundred surgically treated patients were randomly divided into two equal groups according to the management protocol and evaluated by a surgeon after the procedures. Studied complications after septoplasty included; septal hematoma, septal perforation, postoperative adhesions, endonasal bleeding, nasal pain and headache, and respiratory discomfort. Data was collected and analyzed using SPSS statistical software version 16. **Results:** One hundred patients, males were 55 females were 45, the youngest patient was 20 years, the oldest patient was 50 years, the majority of patients were between 31-40 years. The highest incidence of postoperative bleeding was in the 3rd postoperative day in patients with nasal packing while it was minimal on the 3rd day in patients without nasal packing. Septal perforation was found in two patients with packing while perforation was seen in one patient without packing. Fifty patients who had nasal packing were found to have more postoperative morbidity like pain, headache, breathing discomfort. There was no postoperative haematoma and postoperative adhesions in both groups. Postoperative stay in the hospital was longer in patients who had undergone anterior septoplasty with nasal packing and shorter in

patients without packing. Fifty patients without packing were discharged on the 1<sup>st</sup> day after the operation while 45 patients with packing were discharged on the 3<sup>rd</sup> postoperative day and five on the 2<sup>nd</sup> postoperative day.

**Conclusion:** Anterior septoplasty without anterior nasal packing is a safe procedure with less postoperative morbidity and with a shorter hospital stay after operation. It revealed more acceptable functional outcomes compared to anterior septoplasty with nasal packing

**Keywords:** Nasal packing, anterior septoplasty, deviated nasal septum, postoperative morbidity

### **Introduction:**

Septoplasty is the commonest traditional corrective surgical procedure widely used in reconstructive rhinology, indicated for the correction of the deviation of nasal septum (DNS). Nasal packing (internal dressing) as a final step of the septoplasty is usually applied to avoid postoperative complications. Anterior nasal packing with endonasal splint is a common practice to ensure stabilization of the operated nose after septoplasty and to reduce the risk of deviation recurrence. Nasal packing is not necessary after anterior septoplasty and the hospital stay is less in patients without nasal packing. Nasal packing causes postoperative complications like pain [1,2]. In addition to preventing postoperative complications such as endonasal bleeding, adhesion formation, apposition of mucosal flaps, and subsequent septal hematoma and septal cartilage perforation [3]. Systemic complications induced by nasal packing include sleep disturbance, respiratory problems due to blocking the nasal passage like dyspnea and decreased oxygen saturation, in addition to problems within the cardiovascular and pulmonary system, including developing the toxic shock syndrome are reported in the literature [1,4]. Nasal obstruction is the primary indication of septoplasty and can be caused by septal deviation. Deviated nasal septum may be congenital or traumatic. The aim of this study was to compare the common postoperative complications following anterior septoplasty with versus without anterior nasal packing. Postoperative complications looked at included frequency of postoperative pain, headache, respiratory discomfort, bleeding, septal perforation, hematoma, adhesion, and the length of postoperative stay in hospital.

**Patients and Methods:** One hundred patients were operated for septoplasty in Ibn Sina Central & Teaching Hospital, Hadhramout Private Hospital and Al-Madinah Private Polyclinic during the period from January 2002 to December 2012 in Mukalla city, Hadramout, Yemen. The majority of patients were between 31-40 years of age. Males were 55 and females were 45.

Local ethical committee approval was obtained for the study, and all patients signed informed consent before enrollment in the study. Patients with anterior deviated nasal septum enrolled in the study. Patients with posterior deviation of nasal septum, midfacial anomalies, previously operated patients, bleeding disorders and patients with hypertension were all excluded. Fifty patients were randomly assigned to undergo planned anterior septoplasty with nasal packing and the other 50 patients were selected to undergo anterior septoplasty without nasal packing. Postoperative complications were clinically documented by a surgeon. Detailed patient history, careful general ENT and specific examination of the nose, paranasal sinuses and midfacial area was done. Both groups were assessed by the author for postoperative complications; pain, headache, respiratory discomfort, nasal bleeding, septal perforation, hematoma and duration of postoperative hospital stay. Data was collected and analyzed using SPSS statistical software version 16.

### **Results:**

A hundred patients were divided randomly into two equal groups (group A with nasal packing and group B without nasal packing), Fifty patients were between 31 and 40 years of age. Males were 55 and females were 45. (Figure 1&2). There was a slight difference regarding postoperative bleeding and hematoma.

Table 1- Postoperative complications and hospital stay in patients following anterior septoplasty

Variable		Pattern of management of septoplasty by gender			
		Female n= 45		Male n=55	
		Group A	Group B	Group A	Group B
		With nasal packing	Without nasal packing	With nasal Packing	Without nasal packing
Postoperative nasal bleeding	1 <sup>st</sup> day	3	6	7	6
	2 <sup>nd</sup> day	1	3	3	2
	3 <sup>rd</sup> day	5	0	12	1
Septal perforation		1	1	1	0
Nasal pain and headache		24	9	26	10
Postoperative adhesion		0	0	0	0
Septal hematoma		0	0	0	0
Respiratory discomfort		15	1	20	2
Discharge from hospital	1 <sup>st</sup> day	0	25	0	25
	2 <sup>nd</sup> day	20	0	25	0
	3 <sup>rd</sup> day	2	0	3	0

The highest incidence of postoperative bleeding was in the 3<sup>rd</sup> postoperative day in patients with nasal packing while it was minimal on the 3<sup>rd</sup> day in patients without nasal packing. Septal perforation was found in two patients with packing while perforation was seen in one patient without packing. Fifty patients who had nasal packing were found to have greater postoperative morbidity like pain, headache, breathing discomfort . Postoperative stay in the hospital was longer in patients who had undergone anterior septoplasty with nasal packing and shorter in patients without packing. Fifty patients without packing were discharged on the 1<sup>st</sup> day after the

operation while 45 patients with packing were discharged on the 3<sup>rd</sup> postoperative day and five on the 2<sup>nd</sup> postoperative day (Table1).

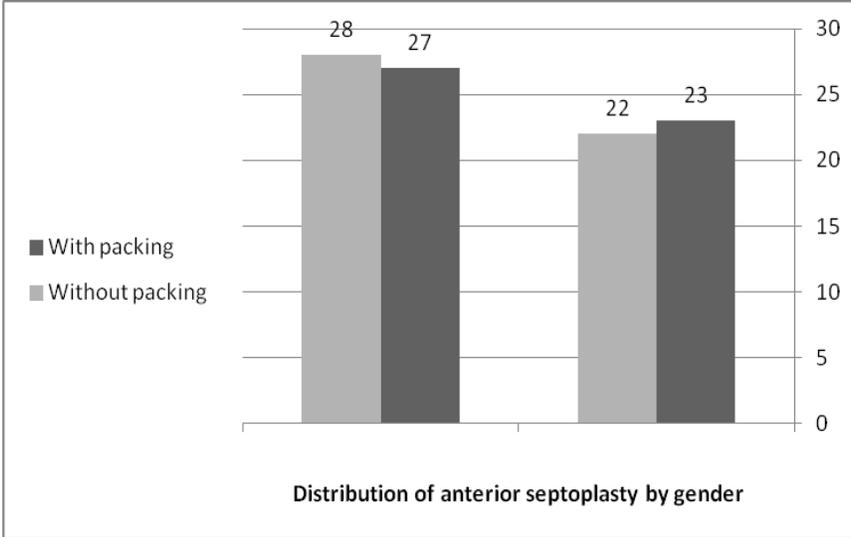


Figure-1 Distribution of anterior septoplasty by gender

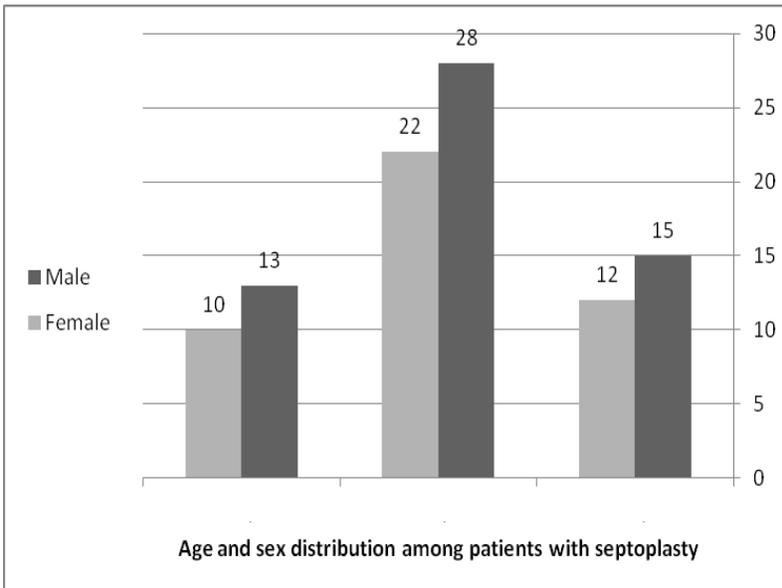


Figure-2 Age and sex distribution among patients with septoplasty

### **Discussion:**

Septoplasty is an essential element of functional and aesthetic reconstructive nasal surgery in which the phase fixation with the internal dressings is an effective method to keep the reconstructed septum in the midline and to prevent a septal hematoma [5]. The results of our trial on hundred patients who underwent anterior septoplasty and followed-up in our clinic, revealed significant differences in both groups. In this study the septal hematoma is a less seen complication in patients who have anterior septoplasty without nasal packing. Hajjiioannou et al. [6] study showed decreased rate of postoperative breathing discomfort and further postoperative complications when nasal packing was removed in the first day. Tzadik et al. reported that nasal packing and internal dressings with anterior septoplasty are unnecessary to apply to the operated nose [7]. Bajaj et al showed decreased rates of postoperative complications in patients who have undergone anterior septoplasty without nasal packing and reported that only 3.8 of the patients required nasal packing [8]. There was an insignificant difference in incidence of septal perforation between the two groups (group A and group B). In our study the patients without nasal packing left hospital earlier compared to patients with nasal packing who were discharged on second and third postoperative day. Few studies reported similar results to our study, that is postoperative nasal bleeding, pain, headache, discomfort and the stay of patients in the hospital is less observed in patients who have anterior septoplasty without nasal packing [1,9,10]. The present study showed similar results with the results from several studies reported by several authors in different countries. Jawaid et al. study stated that nasal packing can be easily avoided following septal surgery, thus minimizing postoperative discomfort of the patient [11]. Naghibzadeh et al. study concluded that septoplasty can be safely performed without postoperative nasal packing and nasal packing had no main advantages compared with trans-septal

suturing and suturing can be used as alternative method to nasal packing [12].

**Conclusion:** Anterior septoplasty without anterior nasal packing is a safe procedure with less postoperative morbidity and with a shorter hospital stay after operation. It revealed more acceptable functional outcomes compared to anterior septoplasty with nasal packing.

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