

Deep neck abscess: a prospective study of 54 cases

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Abstract

Deep neck abscesses (DNAs) continue to be commonly encountered in developing countries like India. This study was conducted to determine the changing trends within our population with respect to presentation, aetiology, location and microbiology of DNAs. Fifty-four patients with DNAs who were managed at the Department of ORL and H&N Surgery in our hospital between May 2002 and December 2002 formed the basis of the study. We observed that the high incidence of DNAs could be attributed to lack of awareness, illiteracy and poverty among patients, along with the poor primary health infrastructure. We also recommend early surgical intervention in these cases to decrease the prevalence of complications.

Key words: Neck; Abscess; Diagnosis, Differential

Introduction

The advent of modern antibiotics and surgical techniques has resulted in fewer complications and deaths following deep neck abscesses (DNAs). But the number of DNAs encountered remains the same, due to the lack of infrastructure at the primary health level. The unhygienic living conditions in urban slums and lack of awareness among the patients contribute to the high incidence of patients presenting with large abscesses.

Material and methods

Patients with a diagnosis of DNAs who were managed at the Department of ORL and H&N Surgery, Maulana Azad Medical College and Associated Lok Nayak Hospital between May 2002 and December 2002 were included in the study. Superficial skin abscesses, abscesses due to infection of external neck wounds, and abscesses in relation to mastoid and facial bone fractures were excluded from this study.

Only clinically confirmed cases of abscesses were included in the study. Needle aspiration was done in all cases to confirm the abscess, and incision and drainage were done at the earliest stage. Pus was sent for culture and sensitivity analysis prior to the start of antibiotic treatment. All, except one patient with penicillin sensitivity, were initially started on a combination of injectable crystalline penicillin, gentamicin and metronidazole. The antibiotics were modified, based on culture sensitivity reports or clinical unresponsiveness, if required. Supportive

therapy, in the form of intravenous fluids, analgesics, antipyretics, antiemetics, mouthwashes, etc., was given. All patients were kept under observation for impending or manifest respiratory distress. Tracheostomy was done in four patients.

Radiology and dental referrals were sought in appropriate cases. Clinical charts, radiological and bacteriological studies, and interventions, along with demographic profile and details of hospital stay, were reviewed. Socioeconomic status, along with literacy rates, was determined for all patients, using the Kuppuswamy¹ classification (Figure 1).

Results

Fifty-four patients were included in the study.

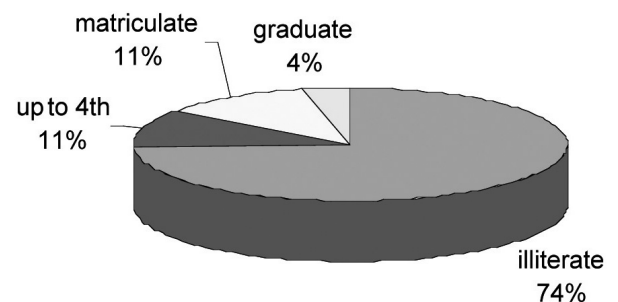


FIG. 1
Literacy rates.

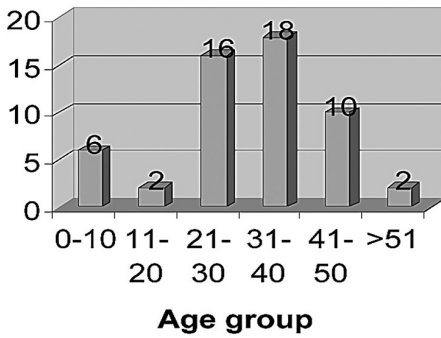


FIG. 2
Age distribution.

Thirty-six were males (66.6 per cent) and 18 (33.3 per cent) were females. The youngest patient was two years old and the oldest was 62 years old. The age distribution of patients is given in Figure 2. The socioeconomic status of all the patients was determined using the Kuppaswamy scale (Table I). Ninety-three per cent belonged to the low socioeconomic strata, 74 per cent were illiterate, and none of the patients admitted in our hospital were aware of the potential complications of DNAs. Ninety-three per cent of patients were unaware of any primary health centres (PHCs) in their vicinity. The rest were referred from PHCs due to lack of proper medical care available there. Diabetes was the most commonly encountered systemic disease (Table II). All patients with diabetes (14.8 per cent) were unaware of the primary disease and presented with DNAs. Only four per cent reported adequate knowledge about HIV and AIDS. Tobacco chewing was the most common addiction, followed by smoking (Table III). One patient who had extensive retropharyngeal and parapharyngeal abscesses was HIV positive. Dental caries was seen in 15 patients and dental hygiene was poor in 28 patients. Tooth extraction was found to be the most common predisposing factor for the abscess. Ten patients who had undergone dental manipulations were unaware of sterile surgical techniques. The average duration after which the patient presented to the hospital was eight days. The distribution of abscesses according to the site of involvement is given in Table IV. The most commonly encountered site was the submandibular region (37 per cent)

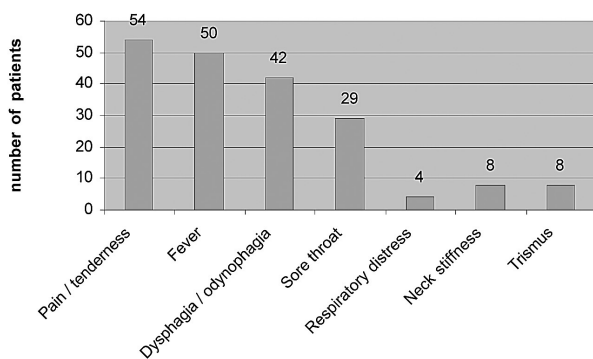


FIG. 3
Signs and symptoms.

TABLE I

SOCIAL CLASS (KUPPUSWAMY'S REVISED CLASSIFICATION)

Score (A + B + C): Class		
26-29	I: Upper class	I: Professional
16-25	II: Upper middle class	II: Managerial
11-15	III: Lower middle class	III: Clerical/skilled
5-10	IV: Upper lower class	IV: Semi-skilled
Below 5	V: Lower class	V: Unskilled
A	Education	Score
1	Professional degree (or Hons or MA above)	7
2	BA or BSc degree	6
3	Intermediate or (post-high school diploma)	5
4	High school certificate	4
5	Middle school certificate	3
6	Primary school certificate	2
7	Illiterate	1
B	Occupation	Score
1	Professional	10
2	Semi-professional	6
3	Clerical, shopkeeper	5
4	Skilled workers	4
5	Semi-skilled worker	3
7	Unemployed	1
C	Income (rupees)	Score
1	> 6000	12
2	3000-5999	10
3	2250-2999	6
4	1500-2249	4
5	900-1499	3
6	300-899	2
7	< 300	1

followed by the submental region. Pain was the most common presenting symptom, followed by fever and dysphagia. Neck stiffness and trismus was present in eight patients. Four patients had respiratory distress (Figure 3). Pus was sterile in 66 per cent (36) of the cases and positive in 33 per cent (18) of the patients. *Staphylococcus aureus* was isolated in 15 per cent followed by *Streptococcus* spp. in seven per cent, and other bacteria isolated are detailed in Table V. Tracheostomy was performed in four patients with diagnosis of Ludwig's angina and retropharyngeal and parapharyngeal abscesses, as they had developed respiratory distress. Incision and drainage were done in 50 patients within 48 hours of the start of antibiotic treatment. Pus was aspirated in four cases (Table VI). Antibiotic treatment had to be changed in six patients, according to sensitivity reports, and was given for at least 14 days. All patients recovered fully without complications. Mean hospital stay was three weeks.

Discussion

Deep neck abscesses have the propensity to

TABLE II

UNDERLYING SYSTEMIC DISEASES

Systemic diseases	Number
Diabetes mellitus	8
HIV	1

TABLE III
ADDICTION

Addiction	Number
Tobacco	28
Smoking	22
Alcohol	12
Others	6

spread along the fascial planes of the neck, and can thus be easily complicated by the involvement of vessels and neck organs.² If the spread of inflammation occurs towards the mediastinum, due to the communication between medial and deep facial layers with the mediastinum, mortality rates increase.^{2,3} The propensity towards mediastinitis is most commonly associated with retropharyngeal abscesses.⁴ Fatal pyothorax, due to secondary involvement of pleura following mediastinitis in a case of massive acute retropharyngeal abscess, has also been reported.⁵ Complications like cavernous sinus thrombosis have been reported in patients with parapharyngeal abscess.⁶ Vascular complications from the extension of a DNA into vascular space can be life threatening. Further spread into the mediastinum can occur via the carotid sheath (Lincoln Highway).⁷ Salinger and Pearlman⁸ have reported a mortality rate of approximately 80 per cent in 32 patients with haemorrhage from retropharyngeal abscess. More recently, Alexander *et al.*⁹ suggested that rupture of a major artery of the neck secondary to the neck abscess has a mortality rate of 20 to 40 per cent, regardless of the treatment given. Reisner *et al.*¹⁰ have reported endovascular occlusion of a carotid pseudoaneurysm in a child with DNA. Similarly, Singh *et al.*¹¹ have described a case of carotid artery erosion in a four-year-old child following parapharyngeal space infection which was successfully treated by carotid ligation. Lack of primary health care and awareness amongst people residing in urban slums were found to be the factors most strongly associated with DNAs in our study. Tobacco chewing was the most common substance abuse in our patients, followed by smoking. Poor dental hygiene and dental infections, which are commonly seen in people in their thirties, are associated with increased incidence of DNAs. Systemic disorders, such as diabetes mellitus and HIV, were found in 20 per cent of patients. No patients with diabetes were managing their condition. Consistent with other

TABLE IV
SITE OF ABSCESS

Site of abscess	Number
Submandibular	20
Submental	10
Peritonsillar	3
Parapharyngeal	6
Retropharyngeal	4
Ludwig's angina	6
Parotid	5

TABLE V
BACTERIOLOGY [Q10]

Bacteria	Number
Sterile	36
<i>Staphylococcus aureus</i>	8
<i>Streptococcus spp.</i>	4
<i>Klebsiella spp.</i>	3
<i>Proteus sp.</i>	1
<i>Enterococcus sp.</i>	1
<i>Pseudomonas sp.</i>	1

authors, the most positive cultures were found to be polymicrobial¹² and the most commonly identifiable single organism in our series was *S. aureus*, found in 15 per cent of cases, as against 54 per cent by Thompson *et al.*¹³ More male patients were encountered in the study.

We believe the time-tested combination of injectable crystalline penicillin, gentamicin and metronidazole is still effective for most patients, provided early incision and drainage are undertaken. Local resistance patterns may alter the usage of antibiotics in particular situations. We recommend early incision and drainage as the standard treatment of choice for all DNAs. We performed incision and drainage in all 50 patients who presented to the hospital within 48 hours of their admission. The remaining four patients were managed by repeated aspiration. We were able to completely avoid complications by early aggressive management. We believe that airway management is the most important means of treating DNAs. With strict observation for impending or manifest respiratory distress we were able to avoid any mortality due to airway problems. Patients with Ludwig's angina with oedema of the floor of the mouth indicate a need for awake elective tracheostomy. We avoided any airway complication by this method in three patients in our study. Early diagnosis, aggressive surgical management and proper airway management are important factors in decreasing mortality associated with DNAs. Another observation in our study was the fact that significant money, manpower and resources could be saved by the presence of primary health care. Also, higher levels of literacy and awareness could go a long way in decreasing the number of DNAs associated with other diseases. The cost of prevention is much lower than that of care, and we feel it is especially relevant for developing countries like ours that the major part of the country's health infrastructure be directed towards preventative health care.

Conclusion

TABLE VI
SURGICAL INTERVENTION

Surgery	Number
Incision and drainage	50
Tracheostomy	4
Repeated aspiration	4

- (1) We are encountering a large number of deep neck abscesses due to the lack of primary health-care facilities and the lack of awareness and education among the population.
- (2) Early surgical intervention decreases morbidity and mortality in cases of DNAs.
- (3) A combination of injectable crystalline penicillin, gentamicin and metronidazole is still good as a first-line drug treatment for DNAs.
- (4) A redirection of money, manpower and resources towards primary health care would go a long way in reducing the incidence of DNAs in developing countries.

- **This is a study of deep neck abscesses and their management from the developing world**
- **The aetiology, presentation and microbiology of 54 such cases is presented and discussed**
- **The authors conclude that early surgical intervention decreases the prevalence of complications**

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Dr R Meher takes responsibility for the integrity of the content of the paper.

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