

Incidence of Post Operative Wound Infection Following the Use of Antibiotics in Clean Contaminated Head and Neck Surgery in a Tertiary Care Centre in Eastern Nepal

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ABSTRACT

Introduction

Post operative wound infection continues to be the major concern even after the appropriate antibiotic coverage.

Objective

To find out the incidence of post operative wound infection following the use of antibiotics in clean contaminated head and neck surgery in a tertiary care centre in Eastern Nepal.

Methodology

It is a prospective study conducted at Department of Otorhinolaryngology and Head and Neck Surgery, Nobel Medical College Teaching Hospital, Biratnagar from 14th April 2013 to 12th April 2015. Patient who underwent clean contaminated head and neck surgery were followed up on 1st, 3rd and 6th post-operative day (POD) and wounds were inspected for any signs of wound infection.

Results

A total of 144 patients undergoing various clean contaminated head and neck surgeries were included in this study. Tonsillectomy was the commonest surgery performed (40.27%). An overall wound infection rate was 11.80%. Serous discharge from the surgical site observed on 3rd post operative day was the most common presentation of wound infection (29.41%). Parotidectomy was the surgery presenting with highest rate of wound infection (31.25%).

Conclusion

This study concludes that even the best technique and appropriate antibiotic has not completely eliminated the problem of wound infection in clean contaminated head and neck surgery.

KEY WORDS

Antibiotics, ENT, wound infection

INTRODUCTION

The Centre for Disease control and Prevention (CDC) for National Nosocomial Infections Surveillance (NNIS) system reports, wound infections are the third most frequently reported nosocomial infection.¹ When surgical patient with nosocomial post operative wound infection died, 77% of the deaths were reported to be related to the infection, and the majority (93%) was serious infections involving organs or spaces accessed during the operation.¹ All patients undergoing head and neck surgery are also at high risk for post operative wound infection. Morbidity in early post operative period without administration of antibiotic ranges from 24% to 87% and with administration of antibiotics ranges from 14-40% in clean contaminated head and neck surgeries.^{2,3,4,5}

Studies have shown that maximal effectiveness of the treatment is achieved if the antibiotics are given prior to contamination. The optimum duration of the prophylaxis has not been determined but is 2 to 7 days.⁶ Several antibiotics have shown to be effective in clean contaminated head and neck surgery including penicillin and its congeners (such as ampicillin and amoxicillin) as well as numerous cephalosporins, macrolides and clindamycin.⁷ The trend of using higher, newer and more expensive antibiotic is a financial burden to the patient. Issues such as efficacy, safety, antimicrobial spectrum, dosing schedules, compliance and cost should be considered in selecting the most optimal therapy.⁷

Amoxicillin and ampicillin+cloxacillin are the antibiotic of choice following clean contaminated head and neck surgery in the Department of Otorhinolaryngology and Head and Neck Surgery, Nobel Medical College Teaching Hospital. However, whether these antibiotics prevent the post operative wound infections in a developing country like Nepal is yet to be studied. Thus an attempt has been made to find out the incidence of wound infection following the use of antibiotics in clean contaminated head and neck surgeries in a tertiary care center in eastern Nepal.

METHODOLOGY

A prospective study carried out at the Department of Otorhinolaryngology and Head and Neck surgery, Nobel Medical College Teaching Hospital, Biratnagar, from 14th April 2013 to 12th April 2015.

Patients eligible to be included in this study were those scheduled to undergo clean contaminated head and neck surgery—tonsillectomy, parotidectomy, hemithyroidectomy, sub-mandibular gland (SMG) excision, sistrunk's operation

during the study period. Clean contaminated wounds were defined as sterile initially but the mucosal barrier was crossed or a potentially infected anatomical cavity was entered during the operation. Patients receiving systemic antibiotic within 72 hours prior to planned procedure, having clinical or laboratory evidence of a pre-existing infection, hypersensitive to penicillins, immunocompromised patients (diabetics, HIV positive, under immunosuppressive therapy) or pregnant females were excluded from the study. The protocol had been reviewed and approved by the Institutional Review Committee while informed consent was obtained from patients before the study.

According to the protocol of the department patients undergoing tonsillectomy, parotidectomy and SMG excision received amoxicillin 500 mg eight hourly for seven days, starting the first dose night before surgery. Patients undergoing sistrunk's operation and hemithyroidectomy received ampicillin + cloxacillin (250mg + 250mg) six hourly for seven days, starting the first dose night before surgery. These patients were then admitted in the wards night before surgery. All patients were followed up and inspected for any signs of wound infection on the first, third and sixth post operative day. Any surgical site presenting with erythema (< = 1 cm), increased tenderness / pain, swelling, purulent discharge, black dead tissue and wound gap were considered infected. Statistical analysis was done for descriptive statistics using frequency and percentage and tabular presentation was done accordingly.

RESULTS

During the period of two years, total of 144 patients fulfilling the inclusion criteria were enrolled in the study. Most of the patients were females (67%) and 33% were male. Age of the patients ranged from 5 to 61 years and majority of the surgery (30%) was performed at the age of 20-29 years. Tonsillectomy was the most common surgery performed (40.27%). Table 1 shows the different surgeries performed and the respective antibiotics prescribed.

Serous discharge from the surgical site manifested as soakage of the bandage followed by pus discharge was the most common presentation of wound infection (Table 2)

In total, 11.80% of patients undergoing clean contaminated head and neck surgery presented with post operative wound infection. Parotidectomy was the surgery presenting with highest rate of wound infection (Table 3).

Table 1 : Frequency distributions of different surgeries performed and antibiotics prescribed

Surgery Performed	n = 144	Percentage (%)	Prescribed Antibiotic
Tonillectomy	58	40.27%	Amoxycillin
Hemithyroidectomy	35	24.30%	Ampicillin + Cloxacillin
Sistrunk's Operation	25	17.36%	Ampicillin + Cloxacillin
Parotidectomy	16	11.11%	Amoxycillin
SMG Excision	10	6.95%	Amoxycillin
Total	144	100%	

Table 2 : Clinical features of patients on 1st, 3rd and 6th POD

Clinical Features	Surgery Performed	Antibiotic	1 st POD	3 rd POD	6 th POD
Serous Discharge (Soakage of the bandage)	Tonsillectomy	Amoxycillin	Absent	Present	Present
	Parotidectomy	Amoxycillin	Present	Present	Present
	Hemithyroidectomy	Ampi+clox	Absent	Present	Absent
	Sistrunk's Operation	Ampi+clox	Present	Present	Absent
	SMG Excision	Amoxycillin	Present	Present	Absent
Discharge from Wound + wound Swelling	Tonsillectomy	Amoxycillin	Absent	Absent	Present
	Tonsillectomy	Amoxycillin	Absent	Present	Present
	Sistrunk's Operation	Ampi+clox	Present	Only Soakage Present	Absent
Increasing Wound Pain	Tonsillectomy	Amoxycillin	Absent	Present	Absent
	SMG Excision	Amoxycillin	Present	Present	Absent
	Parotidectomy	Amoxycillin	Present	Present	Absent
Black dead Tissue Around Wound	Parotidectomy	Amoxycillin	Absent	Present	Present
Increasing redness around wound	Parotidectomy	Amoxycillin	Absent	Present	Present
	Tonsillectomy	Amoxycillin	Absent	Present	Absent
	SMG excision	Amoxycillin	Absent	Present	Present
	Sistrunk's operation	Ampi+clox	Present	Present	Present
Wound gap	Parotidectomy	Amoxycillin	Absent	Present	Absent

Table 3 : Rates of wound infection in different surgeries

Surgery Performed	Antibiotic Prescribed	Wound Infection	
		(n)	(%)
Tonsillectomy	Amoxycillin	5/58	8.62
Hemithyroidectomy	Ampicillin+Cloxacillin	1/35	2.85
Sistrunk's Operation	Ampicillin + Cloxacillin	3/25	12
Parotidectomy	Amoxycillin	5/16	31.25
SMG Excision	Amoxycillin	3/10	30
Total		17/144	(11.80%)

DISCUSSION

It has been long recognized that clean contaminated head and neck surgical procedure are having high risk of post operative wound infections.⁸ The incidence of these without administration of antibiotics ranges from 24% to 87%.¹ The use of antibiotics these days have shown to significantly reduce these infections. Different studies reveal that with the use of antibiotics, infection rates range 14-40%.^{9,10,11} However, even the best operative techniques and appropriate antibiotics have not completely eliminated this problem. To find out the rates of wound infection following the use of antibiotics in different head and neck surgeries is the rationale behind our study.

The most common presentation of patient undergoing clean contaminated head and neck surgery was serous discharge (29.41%) from the surgical site manifested as soakage of the bandage. Serous discharge from the surgical site has been regarded as the most important criteria for diagnosing wound infection.¹² Study conducted in Cleveland by Peel ALG et al¹³ and another study by Wilson AP et al. also reveals serous exudates as the most common manifestations of wound infection.^{13,14} Such serous discharge following clean contaminated head and neck surgery was commonly observed on 3rd POD in this study. This contradicts Mark K Wax's findings where serous discharge is commonly observed on 5th – 7th POD. However, Mark K Wax's also states that though serous discharge are commonly observed on 5th – 7th POD, any discharge from closed surgical wound after 48 hours of closure is of concern.¹⁵ In our study tonsillectomy was the most common surgery performed (40.28%). This supports the study conducted by Alississ A which reveals tonsillectomy as one of the most commonly performed clean contaminated head and neck surgery worldwide.¹⁶ Penicillin and its congeners (such as ampicillin and amoxicillin) is the

recommended antibiotic for patients undergoing tonsillectomy and other head and neck surgeries.⁷ However, there are controversies still going on how best prevent the post tonsillectomy morbidity. The first week after the surgery is extremely difficult for the patient.¹⁶ In our study wound infection rate following tonsillectomy was 8.62% and discharge from wound with wound pain was the most common presentation seen in 3rd and 6th POD. Tonsillectomy invades the oropharyngeal microflora. The lateral dissection injures the superior constrictor muscle. These could be the reason for wound infection in this study. Though tonsillectomy is expected to have higher rate of wound infection because of the oropharyngeal microflora, the rate of wound infection is low in our study (8.62%). The reason behind this finding could be the frequent antiseptic gargle offered to the patients along with antibiotic coverage.

In this study, seventeen patients receiving antibiotics developed wound infection. The highest overall infection rate was noted to be in parotidectomy (31.25%), followed by submandibular gland excision (30%). Longer duration of surgery and excess of tissue handling could be the cause of higher rate of wound infection in parotidectomy. One of the patient undergoing parotidectomy under coverage of amoxicillin presented with black dead tissue around wound on the 3rd and 6th POD. This may be due to the large area of flap elevation during the surgery which in turn may have led to the necrosis of the tip of the flap. Patients undergoing Sistrunk's operation received ampicillin+cloxacillin and presented with 12% of wound infection. In surgeries involving the skin and soft tissue, ampicillin + cloxacillin would be the better choice as far as the sensitivity and normal flora of the skin is concerned. In Sistrunk's operation, usually the core tissue from the base of the tongue is not well defined and attempt to excise the tissue can break the oropharyngeal

mucosa leading to the contamination of the surgical field. This could be the cause of the wound infection in our study. Similarly, in submandibular gland excision, injury to the mucosa on floor of mouth, injury to submandibular duct and leakage of the content of the duct to the surgical field could be an issue leading to higher rate of wound infection. Oozing from the salivary tissue leading to serous discharge which in turn would have led to inflammatory changes in the surgical site could be reason behind the higher rate of wound infection (30%) following submandibular gland excision in this study.

Thus, amongst all the patients undergoing clean contaminated head and neck surgery under coverage of amoxicillin and ampicillin + cloxacillin, post operative wound infection was found to be present in 11.80%. However, this contradicts the findings of Skitarelic N, where the wound infection rate was 24% in patients undergoing clean contaminated head and neck surgery.⁸

CONCLUSION

This study concludes that even the best technique and appropriate antibiotic has not completely eliminated the problem of wound infection in clean contaminated head and neck surgery. The appropriate use of antibiotics in patient care is very important but it cannot be a substitute for good surgical technique.

One of the limitation of this study is only two antibiotics have been used for surgical prophylaxis. It would have been more comparable if different antibiotics have been used.

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