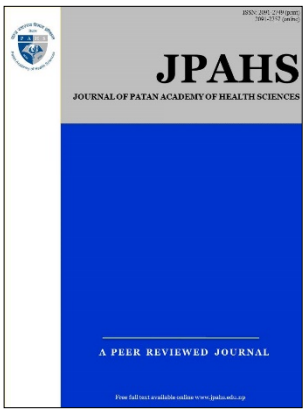

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Appropriateness of perioperative antibiotics in thyroid surgery

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Abstract

Introduction: Most of the guidelines do not recommend routine antibiotics prophylaxis in clean head and neck surgery like thyroidectomy. In contrary to the recommendation, antibiotics are being routinely prescribed in perioperative period for various duration in many centers of Nepal. This study was aimed to find out the need of postoperative antibiotics in surgeries for thyroid related problems.

Method: Records of all patients who had undergone surgery for thyroid related problems from Jan, 2019 to Sept, 2022 were retrospectively reviewed for patterns of antibiotic use, apart from pre-incision antibiotic, in postoperative period which was classified as group A – no antibiotics, group B – shorter course of antibiotics (≤3 days) and group C – longer course of antibiotics (>3 days). The occurrence of surgical site infection (SSI) was recorded.

Result: During the study period, 77 patients underwent surgery for thyroid related problems, out of which five were excluded (records not found in four cases and one patient was ASA III). Two out of 72(2.77%) patients developed superficial incisional SSI which was managed conservatively. One patient in each group A (50) and group B (8) developed SSI.

Conclusion: Postoperative antibiotics can be avoided safely even in our setup in clean head and neck surgeries like thyroidectomy without increase in the risk of SSI thus reducing the cost to the patients.

Keywords: antibiotic prophylaxis, head and neck surgery, neck dissection, SSI, thyroid, thyroidectomy

Introduction

Most of the thyroid surgeries are elective and are considered as clean surgical procedures with very low rate (0.3–2.9%) of surgical site infection (SSI).[1,2] Worldwide there is a trend towards avoidance of routine use of antibiotic prophylaxis in thyroid surgery without increase in incidence of SSI.[3] A study from Indian subcontinent showed that there was no significant difference between short course and long course of antibiotics in preventing SSI in open thyroid surgery.[4] In most of the centers in Nepal, perioperative antibiotics are still administered for varying duration.[5,6] At Patan Hospital, Nepal, study regarding use of antibiotic prophylaxis has not been done in thyroid surgery, but, a study on low risk laparoscopic cholecystectomy, regarded as clean surgery, routine use of antibiotic prophylaxis did not show added advantage in preventing SSI.[7]

There is a dearth of literature regarding antibiotic prophylaxis in our set up. The fear of SSI in thyroid surgery and its consequences has caused many surgeons to adhere to the age-old practice but there is a definite feasibility of following standard practice of use of antibiotics in our set up.[7] In recent years only prophylactic pre-incision antibiotics has been used in most of the thyroid surgeries at our center. The findings from this study would help us to know the chances of SSI with recently changed practice. This study aimed to find out the incidence of SSI with our change in practice of antibiotics use and compare it with published literature.

Method

This is a retrospective chart review of all patients undergoing surgery for thyroid related problems from January 2019 to September 2022 at department of ENT-HNS, Patan Hospital, Patan Academy of Health Sciences (PAHS). Records of all patients, American Society of Anesthesiologists (ASA) I and II, undergoing surgery for thyroid related problems with or without concomitant additional procedure were retrieved from the record section and details of perioperative care and surgery were extracted as per the proforma. Cases with missing records, details of surgery or perioperative care were excluded from the study. Approval from institutional review committee (IRC-PAHS) was obtained (drs2209201676) prior to the commencement of the study.

The pattern of use of postoperative antibiotics was classified as group A – no antibiotics, group B – shorter course of antibiotics (≤3 days) and group C – longer course of antibiotics (>3 days). SSI was categorized based on Centers for Disease Control (CDC) definitions of nosocomial SSI as: superficial incisional SSIs, deep incisional SSIs and organ/space SSI.[8] Details regarding signs of erythema over skin, pus discharge from incision site, dehiscence of wound, fever etc. occurring during the follow up were retrieved. Data was analyzed in MS excel for frequency and percentage of SSI in different groups.

Result

During the study period 77 patients underwent thyroid surgery, out of which records of four patients could not be retrieved and one fell under ASA III. Hence, only 72 were included for final analysis. All patients had received pre-incision (30 min to one hour before incision) and intraoperative antibiotic prophylaxis as per the protocol of the department. Out of 72 patients, 13(18%) were male and 59(82%) were female. Age of the patients ranged from 20-79 y with median age of 41 y. The number of ASA I and ASA II patients were equal (36 each). The surgery was indicated for benign pathology in 44(61%) patients whereas malignant pathology in 28(39%) patients. Among benign pathologies, colloid goiter was the most common 11(25%) diagnosis whereas others were thyroid nodule, multinodular goiter (MNG), toxic MNG, autonomous functioning nodule or follicular adenoma. Among malignant pathologies, papillary carcinoma thyroid 24(86%) was most common diagnosis whereas two each were follicular

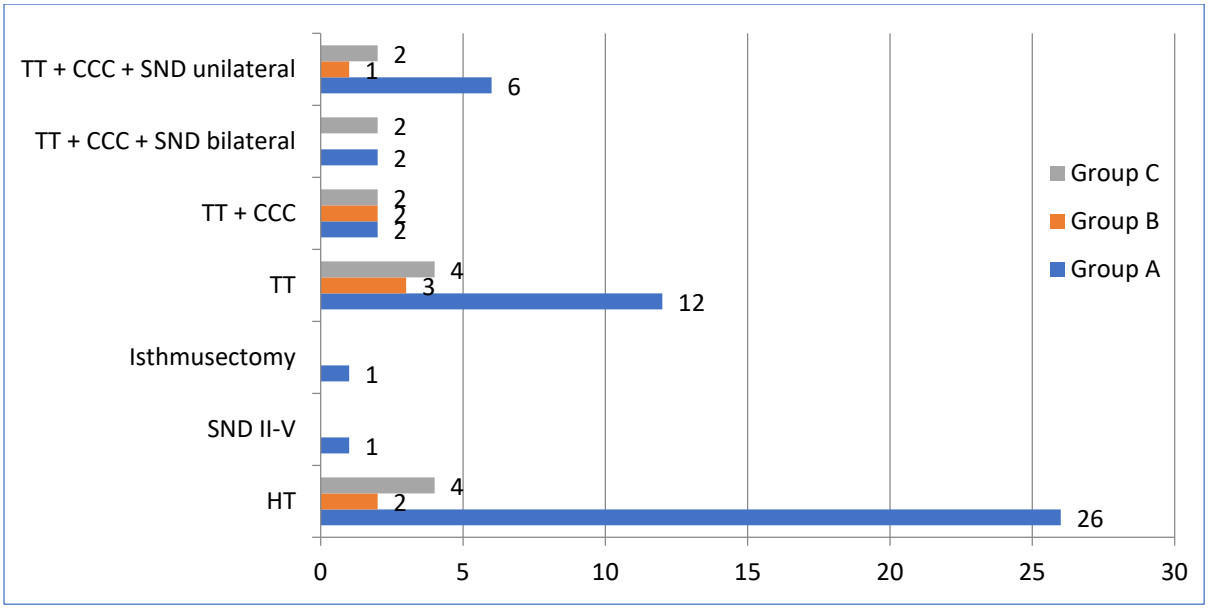
carcinoma and medullary carcinoma. Hyperthyroidism of the patients undergoing surgery either for benign or malignant pathology were optimized prior to surgery which is the routine clinical practice.

Hemithyroidectomy was performed in 32(44%) and total thyroidectomy was performed in 38(53%) patients. One of the patients had undergone isthmusectomy and other had undergone selective neck dissection alone. Total thyroidectomy alone was performed in 19 patients whereas 19 had undergone concomitant selective neck dissection of various extent, Figure 1. One patient each had undergone submandibular gland excision, level I-b clearance and excision of Schwannoma of level V concomitantly.

The duration of surgery ranged from 90–630 min with a median of 210 min. Negative suction drain was placed in 60(83%) patients with median of three days (range 2–6 d). In most of the patients, single drain was placed whereas two drains were placed in cases of bilateral neck dissection. Out of 12(17%) patients in whom negative suction drain was not placed, nine had undergone hemithyroidectomy, two had undergone total thyroidectomy and one had undergone total thyroidectomy with central compartment clearance.

As pre-incision and intraoperative antibiotic prophylaxis, 54 patients received single dose and seven received two doses of injection ceftriaxone 1 g. Seven patients received single dose and three received two doses of injection ceftriaxone 2 g. One of the patients received injection cefazolin 1 g two doses. Second dose of antibiotics was administered in patients with prolonged surgery (> 4 – 6 hours) and significant blood loss as per surgeon's discretion which is practiced routinely in our set up. In postoperative period, 50 patients did not receive any form of antibiotics (group A). Eight patients received antibiotics for ≤3 d (group B) whereas in 14 patients, antibiotics was administered for >3 d (group C) either as injection or in oral preparation, Table 1. The decision of prescribing postoperative antibiotics was based on surgeon's discretion except in cases of re-exploration for hematoma (2) in which case it was administered for prolonged duration (7 d). In group A, seven out of 50 patients, received second dose of antibiotics intraoperatively and duration of surgery in patients who received second dose of antibiotics ranged from 285 to 510 min. Out of 12 patients, in whom negative suction drain was placed for more than three days, seven patients did not receive postoperative antibiotics. Blood transfusion was not required in any of the cases.

Though CDC defines the duration of follow up as 30 days of operative procedure, most of the patients were followed up for two weeks postoperatively as per the departmental practice, unless they developed complications. SSI in the form of peri-incisional skin erythema and mild tenderness was noticed in two cases, Table 1. Both of them had received pre-incision injection ceftriaxone 1 g single dose. In the first case (55 y female, ASA II), skin changes appeared on day seven. The patient had undergone total thyroidectomy for multinodular goiter and duration of surgery was 300 min. Negative suction drain was placed for 3 d. The patient had also received injection ceftriaxone 1 g BD for 3 d. On appearance of skin changes on day seven, patient was started on capsule cloxacillin 500 m QID for seven days. In the second case (45 y female, ASA II), skin changes appeared on day two. The patient had undergone hemithyroidectomy for thyroid nodule and duration of surgery was 150 min. Negative suction drain was placed for 2 d. The patient did not receive antibiotics in postoperative period until skin changes appeared on day two which was managed with injection cloxacillin 500 mg QID for two days followed by capsule cloxacillin 500 mg QID for five days. Both the patients recovered without any major issues. There were no recorded cases of deep incisional or organ/space SSI during hospital stay or during the follow ups.



Note: Group A – No postoperative antibiotics, Group B – ≤3 days of antibiotics, Group C – >3 days of antibiotics. HT – hemithyroidectomy, TT – total thyroidectomy, SND – selective neck dissection, CCC – central compartment clearance.

Figure 1. Type of surgery and patterns of antibiotic use in patients undergoing thyroid surgery

Table 1. Patterns of antibiotic use and surgical site infection (SSI) in patients undergoing thyroid surgery

	No. of patients	No. of patients with superficial incisional SSI
Group A	50	1
Group B	8	1
Group C	14	0
Total	72	2

Discussion

The current study found out the incidence of SSI to be two out of 72(2.77 %). One patient in each group, with no antibiotics and ≤ three days' antibiotic, had SSI. The incidence of SSI in our study is similar to the findings from other studies that reported the incidence to be ranging from 0.3–2.9%.[1,2] In a study conducted in India among 50 patients undergoing thyroid surgery, who were divided into single day versus 5-day antibiotic prophylaxis regimen, there was no significant difference in SSI.[4] In this study participants in group A, if the surgery was prolonged for more than 4 hours, only the second dose of antibiotics is administered. In their study, however, two patients were shifted from single day to 5-day group because of prolonged duration of surgery (>3 hours). In another study from India which included 30 patients undergoing thyroid surgery, divided into two groups, none of the patients developed SSI.[9] One of the groups received postoperative antibiotics and other did not receive postoperative antibiotics. But the study has not mentioned about the pre-incision antibiotics or the duration of antibiotics administered in postoperative period. In contrast to our study the incidence of SSI was 6.02% (5/83) in clean head and neck surgery where only pre-incision antibiotic (injection amoxicillin + clavulanic acid) was administered and repeated if prolonged >4 hours.[10] However, this study was not limited to thyroid surgery but included all head and neck surgery requiring skin incision without violating mucosa. Another prospective study recruiting 71 patients randomly divided into two groups, with or without antibiotics, did not find any difference in SSI between the two groups.[11]

During the initial phase of our study, the routine practice was to prescribe the

antibiotics for 5–10 days post-operatively in almost every patient. The study conducted at our center, found no added advantage of routine use of antibiotic prophylaxis in low risk laparoscopic cholecystectomy.[7] The practice gradually shifted to shorter course of postoperative antibiotics and then to no postoperative antibiotics at all.

SSI remains one of the major factors that can complicate the outcome of surgery adding the morbidity and mortality for the patient who is otherwise a healthy individual; at the same time it is a nightmare for surgeons. SSI is rarely seen in clean surgeries where the frequency of SSI is predicted to be less than 2–5 percent.[12] Apart from class of wound, there are other factors that are responsible for SSI which may either be patient related (endogenous) or procedure related (external).[13] Poor nutritional status of the patient, presence of comorbidities, older age, etc. are patient related factors whereas external risk factors that may contribute to SSI include the type and duration of operation, surgeon's skill, the quality of preoperative skin preparation, adequacy and timing of antimicrobial prophylaxis, insertion of foreign material or implants, inadequate sterilization of surgical instruments, etc. Quality of the operating theatre setup is another key component that can influence the rate of SSI.[3,14] However, approximately half of the SSIs are preventable if evidence-based strategies are strictly followed.[15] An audit of experience of serious wound infection among British Association of Endocrine Surgery (BAES) members noted mortality of five patients following thyroidectomy.[16]

The systemic review and meta-analysis had identified older age, malignancy, neck dissection and placement of drain as a risk factors for SSI.[3] In this study the risk factors for SSI could not be specifically identified. In comparison to ones who developed SSI, other patients had undergone more extensive (concomitant neck dissection) or prolonged surgery, with placement of negative suction drains for longer duration. Though both of the patients who developed SSI were female and ASA II, this cannot be attributed for SSI.

Clinical practice guidelines (CPG) for antimicrobial prophylaxis in surgery as well as systemic review and meta-analysis do not recommend routine use of antibiotic prophylaxis in thyroid surgeries.[3,17,18] There is a recommendation of antibiotic prophylaxis only for high risk patients or for those patients with contaminated wounds.[19] An analysis of the Japan Nosocomial Infections Surveillance database from 2013 to 2020 for SSI in thyroid and parathyroid surgery recommend antibiotics for patients with poor general condition and prolonged operative time.[20] In contrary to the recommendations, many centers in Nepal and India, antibiotics are being prescribed for various duration following thyroidectomy.[4–6] In an international survey among endocrine surgeons, the patterns of antibiotic use varied widely among European, American and Asian surgeons. Most of the Asian surgeons (58.3%) almost always prescribed antibiotic prophylaxis in contrary to European surgeons whereby only 8.8% do so routinely.[12]

The result of current study supports the change in practice at our setup whereby with limited resources and provision for quality control, if we stick to the basic sterilization techniques and proper patient preparation, routine postoperative antibiotics can be avoided. However, based on this study, we cannot refute the use of pre-incision prophylaxis for clean surgeries like thyroidectomy as practiced in most of the centers in Europe and America.

Conclusion

Routine postoperative antibiotics use is avoidable in cases of clean head and neck surgery like thyroidectomy if due care is taken in sterilization technique and preparation of patients. This will not only decrease the economic burden to patients but also curb the risk of emergence of antibiotic resistance.

Conflict of Interest
None

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Author Contribution
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