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Research article

Duration of Hospital Stay and Treatment Pattern among Patients Undergoing Common Operative Procedures at tertiary care hospital in Nepal

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ABSTRACT

Background and Objectives: Appendectomy, cholecystectomy, fistulectomy, and herniotomy or herniorrhaphy are the most common surgical operations in Nepal. Despite the high prevalence and complexity of the patient population served by general and universal surgery services, little has been reported about the services, treatment procedures and outcomes. Therefore, the study is designed to investigate the duration of hospital stay, and treatment pattern among patients undergoing common surgical operative procedures at Janaki Medical College, Janakpur, Nepal.

Material and methods: A prospective observational study was conducted among patients undergoing common surgical operative procedures at surgery department of Janaki Medical College (JMC) over a period of one year from January 2018 to December 2018. Patients of all age groups and gender undergoing surgical operative procedures; appendectomy, herniotomy cholecystectomy and fistulectomy were included in the study. The patients were assessed preoperatively, intra-operatively and postoperatively.

Results: In a total of 325 patients, 11.1% of patients underwent fistulectomy, 14.5% underwent appendectomy, 35.4% underwent herniorrhaphy and 39.1% underwent cholecystectomy. Mean duration of stay at hospital for cholecystectomy was slightly higher (8.13±2.40 days) than other operating procedures: fistulectomy (5.44 ±1.48 days), appendectomy (7.40±2.00 days), and operative procedure of hernia (6.17±1.59 days). Most commonly used antibiotic for control of preoperative and post operative infection was third generation cephalosporin's, ceftriaxone and cefixime.

Conclusion: The study demonstrates longer duration of hospital stay for cholecystectomy as compared to other operating procedures like fistulectomy, appendectomy, herniorrhaphy, hernioplasty and herniotomy with significant difference by types of surgery. Most commonly used antibiotic for control of infection was third generation cephalosporin, ceftriaxone and cefixime.

Key words: Duration of Stay, Surgical operative procedures, Treatment Pattern

INTRODUCTION

Appendectomy, cholecystectomy, fistulectomy, herniotomy and herniorrhaphy are the most common surgical operative

procedures in Nepal. However, the country is ill-equipped to care for common surgical diseases with a significant unmet surgical need [1]. Deficient infrastructure, personnel and equipment limit even primary surgical care have left many developing countries, including Nepal, unable to care for the growing burden of surgical diseases [2]. Moreover, those in need of surgery face significant access to care barriers resulting in many surgical conditions go untreated, increasing the risk of complications and the emergency consequences of their disease [3]**.** Also, Nepal's complex territories and infrastructure deficiencies limit access to surgical care for much of the population, portending a substantial unmet surgical disease burden [4].

Appendectomy is one of the most common techniques of surgeries done by conventional open method. However, laparoscopic surgical procedures, laparoscopic appendectomy is also practiced nowadays in Nepal. It has strived to prove its superiority over the open technique [5]. Laparoscopic cholecystectomy is the surgical treatment for gallbladder disease. However, different centers have reported different conversion to open surgery and postoperative complications in Nepal [6]. Diverse modalities in modern science treat Fistula-in-ano, but today, no single modality has proved to be a complete cure. However, severe postoperative complications like fecal incontinence, high recurrence rate are reported frequently [7]. Similarly, Laparoscopic hernia repair as a routine procedure for groin hernias. This technique is highly demanding and complex. In our country, the development of the laparoscopic technique is still in developing phase [8].

In Nepal, modern surgical practice is quite recent. Minimal surgical trauma, resulting in a significantly shorter length of hospital stay, lower postoperative pain, faster return to daily activities and improved outcomes, has made modern surgery very popular [9] but has limited use in our area. Despite the high prevalence and complexity of the patient population served by general and universal surgery services, little has been reported about the services, treatment procedures and outcomes. Therefore, the study is designed to investigate the duration of hospital stay, operative procedure and treatment pattern among patients undergoing common surgical operative procedures at Janaki Medical College, Janakpur, Nepal.

MATERIAL AND METHODS

Prospective observational study was conducted at surgery ward for a period of one year, from Janauary 2018 to December 2018 among patients undergoing common surgical procedures at Janaki Medical College (JMC), which is a tertiary hospital with a bed capacity of more than 500, serving about 5 million people. Patients of all ages and gender who underwent common surgical procedures (appendicectomy, herniotomy/ herniorrhaphy, cholecystectomy, and Fistulectomy) at Janaki Medical College (JMC) were eligible and were included in the study. The patients were assessed preoperatively, intra-operatively and postoperatively. Patient demographic information, preoperative data, intra-operative data and postoperative data, duration of hospital stay were obtained using a standardized data collection form. Details recorded included; type of surgery, type and duration of operation, antimicrobial prophylaxis and duration of hospital stay. All patients were followed up from the time of admission until the time of the discharge.

Duration of stay was defined as the period between admission and discharge (measured in days). For patients discharged on the same day of admission, it was considered one day of hospital stay. Age of the patients was recorded in completed in years, and it is further divided into five categories less than 15 years,15-29 years, 30-44 years, 45-59 years and ≥60 years. Gender was recorded as male and female. Caste ethnicity was classified as; Dalit, Janajati and Terai Caste Group. The area of residents was categorized as rural municipality and urban municipality.

The source of admission at the surgery department was recorded from the emergency department or outpatient department (OPD). Ethical Clearance for the study was obtained. Informed consent was taken. After detailed history and examination, all patients underwent standard diagnostic investigations. The laboratory investigations included blood examination, urine examination, serum electrolytes,

RESULTS

Table 1 shows the age sex distribution of patients undergoing common surgical operative procedures in the department of surgery at Janaki Medical College. More than half (55.7%) of the patients were in the age group 15 to 44, around one fifth (21.2%) were in the age group 45 to 59, and remaining were either child (11.1%) aged under fifteen years or elderly (12.0%) of sixty years and above. Of these183 (56.3%) were male, and the remaining 142 (43.7 %) patients were female.

During period of one year, three hundred twenty five (325) patients were diagnosed for common surgical operative procedures at department of surgery in Janaki Medical College. Among them, 11.1% of patients underwent fistulectomy, 14.5% underwent appendectomy, 35.4% underwent herniorrhaphy and 39.1% underwent cholecystectomy. Of the total study subjects, more than two third of patients with fistula, appendicitis and cholelithiasis were observed in the age groups of 15-44. However, for hernia, children aged (under 14 years) and elder (aged 45 years and more) constituted two third of the total patients.

Higher proportion of fistula (94.4%), appendicitis (55.3%), and hernia (93.0%) was observed in male, however cholelithiasis was observed higher (87.4%) in female. Patients from terai caste group contributed higher proportion for all the surgery; fistula (75.0%), appendicitis (76.6%), hernia (65.2) and cholelithiasis (72.4%) as compared to janjati and dalit ethnic group. Similarly, patients residing in rural area exhibited higher proportion of fistula 61.1%, appendicitis 66.0%, hernia 51.3% and cholelithiasis 54.3% as compared to patients residing in urban area. The proportions of patients admitted in surgery department were higher from OPD as compared to emergency;100% vs 0% for fistula; 63.8% vs 36.2% for appendicitis 97.4% vs 2.6% for hernia and 84.3% vs 15.7% for cholelithiasis (Table 2).

Table 1: Age sex distribution of the patients undergoing common surgical operative procedures

Age group (years)	Male		Female		All	
	N	%	N	%	N	%
<15	29	15.8	7	4.9	36	11.1
15-29	39	21.3	46	32.4	85	26.2
30-44	41	22.4	55	38.7	96	29.5
45-59	44	24.0	25	17.6	69	21.2
≥60	30	16.4	9	6.3	39	12.0
Total	**183**	**56.3**	**142**	**43.7**	**325**	**100**

Table 2: Basic characteristics of the patients by types of surgery

Characteristics	Fistula (n=36)		Appendicitis (n=47)		Hernia (n=115)		Cholelithiasis (n=127)	
Age group (years)	N	%	N	%	N	%	N	%
0-14	0	0.0	9	19.1	24	20.9	3	2.4
15-29	11	30.6	15	31.9	14	12.2	45	35.4
30-44	13	36.1	16	34.0	21	18.3	46	36.2
45-59	10	27.8	5	10.6	29	25.2	25	19.7
≥60	2	5.6	2	4.3	27	23.5	8	6.3
Gender								
Male	34	94.4	26	55.3	107	93.0	16	12.6
Female	2	5.6	21	44.7	8	7.0	111	87.4
Caste/ Ethnicity								
Dalit	1	2.8	4	8.5	14	12.2	6	4.7
Janajati	8	22.2	7	14.9	26	22.6	29	22.8
Terai Caste Group	27	75.0	36	76.6	75	65.2	92	72.4
Area of Resident								
Rural Municipality	22	61.1	31	66.0	59	51.3	69	54.3
Urban Municipality	14	38.9	16	34.0	56	48.7	58	45.7
Source of Admission								
Emergency	0	0.0	17	36.2	3	2.6	20	15.7
OPD	36	100.0	30	63.8	112	97.4	107	84.3

Table 3: Duration of stay and operating procedure among patients undergoing major surgery

Disease	Operative Procedure	Duration of Hospital Stay (Mean ±SD)	Test of Significance	
Fistula	Fistulectomy	5.44±1.48	F= 28.02	P< 0.0001
Appendicitis	Open Appendectomy	7.40±2.00		
Cholelithiasis	Open cholecystectomy	8.13±2.40		
	Laparoscopic cholecystectomy			
Hernia	Herniorrhaphy	6.17±1.59		
	Hernioplasty with prolene mesh			
	Herniotomy in children			

Duration of stay at hospital and operating procedure for fistula, appendicitis, hernia and cholelithiasis is presented in table 3. Mean duration of stay at hospital for cholecystectomy was slightly higher (8.13±2.40 days) than the other operating procedure fistulectomy (5.44 ±1.48 days), appendectomy (7.40±2.00 days), and operative procedure of hernia (6.17±1.59 days). Days of stay at hospital differed significantly between different operating procedure ($p<0.0001$).

Pattern of treatment among patients undergoing major surgery are presented in detail in table 4. For the surgical procedures conducted at JMC, the treatment protocol was divided into preoperative phase and post operative phase. During the preoperative phase, the only antibiotic administered was third generation cephalosporin, ceftriaxone at a dose of 1 gram IV stat to all the patients undergoing operative procedure as preoperative prophylaxis. Similarly, during the postoperative phase ceftriaxone 1 gram IV was administered twice daily for 3 days to all the patients except in patients who had undergone open appendectomy where

Table 4 Pattern of treatment among patients undergoing major surgery

Diagnosis	Operative procedure done	Preoperative prophylaxis drugs	Postoperative IV drugs		Postoperative Oral drugs	
			Administration	Duration	Administration	Duration
Cholelithiasis (n=127)	Open cholecystectomy	Inj. Ceftriaxone 1g IV stat	Inj. Ceftriaxone 1g	3 days	Tab. Cefixime 200 mg BD	5 days
			Inj. Diclofenac 1 Amp. IM BD for 20 hours	1 days		
					Tab. Ibuprofen 400 mg + Paracetamol 500 mg TDS	5 days
					Tab. Ranitidine 150 mg BD	7 days
	Laparoscopic cholecystectomy	Inj. Ceftriaxone 1g IV stat	Inj. Ceftriaxone 1g	3 days	Tab. Cefixime 200 mg BD	5 days
			Inj. Diclofenac 1 Amp. IM BD	1 days		
					Tab. Ibuprofen 400 mg + Paracetamol 500 mg TDS	5 days
			Inj. Ranitidine 50 mg IV TDS	1 days		
					Tab. Pantoprazole 40 mg BD 7 days	7 days
Acute Appendicitis (n=47)	Open Appendectomy	Inj. Ceftriaxone 1g IV stat	Inj. Ceftriaxone 1g IV BD	5 days	Tab. Ofloxacin 200 mg BD	5 days
			Inj. Metronidazole 500 mg IV TDS	3 days	Tab. Metronidazole 400 mg TDS	6 days
			Inj. Diclofenac 1 Amp. IM BD	1 days	Tab. Ibuprofen 400 mg + Paracetamol 500 mg TDS	5 days
			Inj. Ranitidine 50 mg IV TDS	1 days		
					Tab. Pantoprazole 40 mg BD	7 days
Hernia (n=115)	Herniorrhaphy	Inj. Ceftriaxone 1g IV stat	Inj. Ceftriaxone 1g IV BD Inj. Diclofenac 1 Amp. IM BD Inj. Ranitidine 50 mg IV TDS	3 days 1 days 1 days	Tab. Amoxycillin + Clavulanic acid 625 mg TDS	5 days
	Herniotomy in children	Inj. Ceftriaxone 500mg IV stat			Syrup/Tab Amoxycillin + Clavulanic acid based on weight	7 days
	Hernioplasty with prolene mesh	Inj. Ceftriaxone 1g IV stat	Inj. Ceftriaxone 1g IV BD	3 days	Tab. Amoxycillin + Clavulanic acid 625 mg TDS	5 days
			Inj. Diclofenac 1 Amp. IM BD	1 days		
			Inj. Ranitidine 50 mg IV TDS	1 days		
Fistula (n=36)	Fistulectomy	Inj. Ceftriaxone 1g IV stat	Inj. Ceftriaxone 1g IV BD	3 days	Tab. Ofloxacin 200 mg BD	7 days
			Inj. Diclofenac 1 Amp. IM BD	1 days	Tab. Metronidazole 400 mg TDS	7 days
			Inj. Ranitidine 50 mg IV TDS	1 days	Tab. Ibuprofen 400 mg + Paracetamol 500 mg TDS	5 days
					Tab. Pantoprazole 40mg BD	7 days
					Syrup Lactulose BD	7 days
					Inj. Ketorolac 30 mg IM	SOS
					Sitz bath	30 days

daily for 5 days, while ceftriaxone was not administered in herniotomy of children.

Also, during the first 24 hours of postoperative period, the only nonsteroidal anti-inflammatory drug (NSAID) administered to control postoperative pain was diclofenac sodium at a dose of 1 ampoule (75 mg) IM twice daily except in operative cases of hernia for children where herniotomy was performed.

Immediately following the operative procedure, parenteral antibiotic ceftriaxone 1 gram was administered IV twice daily for 3 days followed by another third generation cephalosporin, cefixime at a dose of 200 mg per oral was continued twice daily for 5 days, NSAID diclofenac 1 ampoule (75 mg) twice daily for 24 hours was administered followed by a fixed dose combination of ibuprofen 400 mg and paracetamol 500 mg thrice daily for 5 days along with H2 receptor blocker ranitidine administered at a dose of 50 mg IV thrice daily for 1 day followed by oral administration of ranitidine 150 mg twice daily for 7 days in both the operative procedures of cholelithiasis i.e open cholecystectomy and laparoscopic cholecystectomy.

For the surgical procedure open appendectomy, ceftriaxone 1 gram was administered IV twice daily for 3 days followed by cefixime 200 mg per oral was continued twice daily for 5 days, NSAID diclofenac 1 ampoule (75 mg) twice daily for 24 hours was administered through IM route followed by a fixed dose combination of ibuprofen 400 mg and paracetamol 500 mg thrice daily for 5 days along with H2 receptor blocker ranitidine administered at a dose of 50 mg IV thrice daily for 1 day followed by administration of proton pump inhibitor pantoprazole 400 mg per oral twice daily for 7 days.

For the surgical procedure of hernia, herniorrhaphy and hernioplasty with prolene mesh, postoperatively parenteral antibiotic ceftriaxone 1 gram was administered IV for 3 days followed by fixed dose combination of amoxicillin 500 mg and clavulanic acid 125 mg (Indclav 625) per oral thrice daily for 5 days was administered. NSAID diclofenac 1 ampoule (75 mg) IM twice daily for 24 hours and H2 receptor blocker ranitidine was administered at a dose of 50 mg IV thrice daily for 1 day. However in cases of heniotomy, only Syrup/Tab Amoxycillin + Clavulanic acid based on weight was administered postoperatively per oral thrice daily for 7 days.

For operative procedure fistulectomy, ceftriaxone 1 gram was administered IV twice daily for 3 days followed by first generation fluroquinolone, ofloxacin at a dose of 200 mg was continued per oral twice daily for 7 days, NSAID diclofenac 1 ampoule (75 mg) IM twice daily for 24 hours was administered followed by a fixed dose combination of ibuprofen 400 mg and paracetamol 500 mg thrice daily for 5 days along with H2 receptor blocker ranitidine administered at a dose of 50 mg IV thrice daily for 1 day followed by administration of pantoprazole 40 mg pr oral twice daily for 7 days. Additionally, tablet metronidazole 400 mg was administered thrice daily for 7 days, syrup lactulose twice daily for 7 days, injection ketorolac 30 mg IM as required and sitz bath was advised.

DISCUSSION

The present study demonstrates duration of hospital stay varies as per types of surgery. Longer duration of hospital stay was

observed for cholecystectomy as compared to other operating procedure like fistulectomy, appendectomy, herniorrhaphy, hernioplasty and herniotomy. We observed duration of hospital stay significantly differed according to types of surgical procedure ($p<0.0001$). This finding indicates length of hospital stay is varying for different types of surgical procedures. Duration of hospital stay for appendectomy in this study is slightly higher than the other studies conducted in Nepal which showed mean hospital stay ranges from 3.19 (2.16) days to 5.14 (0.72)days [5, 10]. It ranges from 5.15(0.09) days to 4.76 (0.01) days in Taiwan [11, 12] and 4.1(0.8) days in India [13]. Similarly, duration of hospital stay for fistula, cholecystectomy and hernia were 1.44 days, 4 days and 4 days respectively in the studies conducted in Nepal [14-16] which are lower than the present study. Another studies conducted at Nepal also demonstrate lower length of hospital stay for hernia, cholecystectomy and fistula [17, 18].

In this study, the antibiotics that were administered were cephalosporins (Ceftriaxone & cefixime),ofloxacin, Metronidazole and combination of Amoxicillin & Clavulanic acid (INDCLAV 625) which were also administered in study done at tertiary care hospitals in Nepal, Addis Ababa and West Ethiopia [19-21]. In this study the most prescribed drug for preoperative prophylaxis was third generation cephalosporin, ceftriaxone which was also administered in the study conducted at various tertiary care hospitals [19-22]. For post operative infection control , most commonly prescribed IV antibiotic was ceftriaxone which is similar to study conducted by Wokuma T and Dedefo M at West Ethiopia [21], however another drug cefixime from the same generation of cephalosporin was administered orally 24 hours later for postoperative infection control in this study for operative procedures of Cholelithiasis.

The use of ampicillin cloxacillin combination was limited to postoperative infection control in operative procedures for hernia.

In the current study, postoperative pain control was achieved for the first 24 hours by NSAID, Diclofenac sodium 75 mg IV twice daily followed by oral administration of fixed dose combination of ibuprofen(400 mg) and paracetamol (500 mg) thrice daily for varying duration for varying operative procedures depending on the need of pain control in patient. In line with this study, Diclofenac, Paracetamol and Ibuprofen has also been used for postoperative pain control in various studies conducted around the world [23-26].

CONCLUSION

The present study demonstrates higher duration of hospital stay for cholecystectomy as compared to other operating procedures like fistulectomy, appendectomy, herniorrhaphy, hernioplasty and herniotomy with significant difference by types of surgical procedures. Most commonly used antibiotic for control of infection preoperatively was third generation cephalosporin, ceftriaxone, while control of infection both in the preoperative and postoperative phase was done by third generation cephalosporin's, ceftriaxone and cefixime. First generation fluroquinolones, ofloxacin was used in case of open appendectomy and fistulectomy while fixed dose combination of amoxicillin and clavulanic acid (Indclav 625) was used in case of herniorrhaphy, herniotomy in children and hernioplasty with prolene mesh for control of postoperative infection. NSAID's like

diclofenac and fixed dose combination of ibuprofen (400 mg) and pracetamol (500 mg) were used to control postoperative pain while H2 receptor blocker, ranitidine and proton pump inhibitor, pantoprazole were used to prevent gastric irritation/gastritis.

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