

**GUT RESECTION AND ANASTOMOSIS: A FIVE-YEAR EXPERIENCE AT THE MOI TEACHING AND REFERRAL HOSPITAL, ELDORET, KENYA.**

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**ABSTRACT**

**Problem statement:** The advances in the procedure of gut resection and anastomosis has undergone a series of transitions with varied levels of adoption in different hospital institutions. This has prompted a wide variation in experiences.

**Objective:** To explore and share the surgical experiences with gut resection and anastomosis over a five-year period in Moi Teaching and Referral Hospital (MTRH), Eldoret, Kenya.

**Design:** Retrospective, hospital based study of patients who underwent resection and anastomosis in the hospital.

**Setting:** The general surgical wards of Moi Teaching and Referral Hospital, a 750 bed tertiary teaching and referral hospital in the Western region of Kenya for the period 2002 – 2006 both years inclusive.

**Population:** Two hundred and twenty patients of all ages who underwent gut resection and anastomosis for varied reasons over the period of study.

**Main outcome measures:** The primary outcome measures were demographic data on gut resection and anastomosis, common reasons for it and the types of anastomosis done. The secondary outcome measures were morbidity and mortality following gut resection and anastomosis.

## **Editorial**

In this issue (3<sup>rd</sup> issue), we are shifting from print production to electronic transmission of the journal. This is an important milestone and we believe that once all technical handles are streamlined, the journal will in future be able to release regular issues.

There is a wide spectrum of subject coverage ranging from assessment of turnaround time for lab operations, HiV disclosure , foster care, TB and Malaria. In the last issue of the journal, I had appealed to authors to prepare manuscripts on “One Health” experiences. Currently, this is a trendy subject and we would like to tap on the experiences of our prospective authors. My appeal still stands and I hope to receive some manuscripts in this area in subsequent issues.

**Editor-in-Chief**

**Results:** There was a male: female ratio of 2.5:1. The age ranged from 2 days to 94 years with a mean  $\pm$  standard deviation of 34.2 $\pm$ 23.4 years. Majority of the patients (34%) were in the age group 0- 20 years. Acute abdomen accounted for 95% of the causes leading to resection and anastomosis. Most of the patients presented within days of the onset of symptoms, leading to deranged vital signs in 65% of them. The delays in presentation and need for resuscitation led to delay in surgery with 35% of the patients getting operated on more than 24 hours after admission. Post -operative complications, duration of hospital stay and outcome of management were related to the types of anastomosis done. The morbidity and mortality rates were 22.7% and 15.9% respectively.

**Conclusions:** The MTRH experience with gut resection and anastomosis compares favourably in morbidity and mortality with other institutions in the world.

**Key words:** Gut, resection, anastomosis, acute abdomen, morbidity and mortality

## **INTRODUCTION**

Gut resection and anastomosis is a major abdominal surgery with inherent challenges before, during and after the operation (Ameh et al., 1997). Attempts at gut repair during the major wars led to depressing levels of morbidity and mortality (Galland and Spencer, 1986) that necessitated a policy of staged resection that held sway up to the 1990s (Morgan et al., 1985, Wilson and Gollock, 1989). As the twentieth century drew to a close, surgeons noted a promising trend in one-stage gut resection and anastomosis (Raveenthiran, 2004). Concepts like preoperative gut preparation and elaborate vascular markings were superseded by the new developments (Lukianeko et al., 2004). But even with the new approaches, the patient with a diseased gut remains a serious challenge (Hennekinne-Muci et al., 2005). with anatomical, physiological and nutritional problems. It is recommended that the least risky of the procedures be undertaken (Guseinov et al., 2003, Fartmann et al., 1994). Despite gallant efforts, even in the best of the institutions, the morbidity and mortality of these patients can be discouragingly high (Ameh et al., 1997, Raveenthiran, 2004, Hennekinne-Muci et al., 2005, Fartmann et al., 1994, Chatterjee et al., 2004). This paper is an exploration and sharing of our experience with gut resection and anastomosis in a tertiary centre in Western Kenya and gauges this experience against other institutions in the world.

## MATERIALS AND METHODS

Patients who had undergone gut resection and anastomosis within the five years' study period were identified from the theatre register of operations. The files were then retrieved from the records department and relevant data extracted using a pre-designed questionnaire in line with the outcome measures.

Files that contained inadequate information on the required data were excluded from the study in spite of the patients having undergone resection and anastomosis.

Collected data was confirmed for completeness before being coded and transferred to a spread sheet and entry into a computer using Statistical Package for Social Sciences (SPSS) software version 11.0. Analysis was for measures of spread and central tendencies. Inferential statistics assumed a 95% confidence interval and statistical significance at  $p$  value  $\leq 0.05$ .

## RESULTS

Two hundred and thirty six files were retrieved, 16 of which were deemed to be incomplete. The remaining 220 files were entered into the study.

There were 158 males and 62 females, giving a male: female ratio of 2.5:1. The age ranged from 2 days to 94 years with a mean  $\pm$  standard deviation of  $34.2 \pm 15.7$  years.

Thirty-four percent of the patients were in the age set 0 – 20 years. Table 1 below shows the age and sex distribution of the study group.

**Table 1: Age and gender distribution**

AGE IN YEARS	GENDER		Total
	Male	Female	
0-20 years	47	28	75
21-40 years	42	18	60
41-60	41	11	52
61-80 years	21	5	26
>80 years	7	0	7
<b>Total</b>	<b>158</b>	<b>62</b>	<b>220</b>

The reasons for gut resection and anastomosis were acute abdomen (95%) and trauma (5%). The trauma cases were predominantly assault with penetrating abdominal injuries and almost all were in the age bracket 40 years and below.

Majority of patients (90%) presented with abdominal pains, abdominal distension, vomiting, hotness of body and obstipation in varying combinations. There was a statistically significant positive correlation between the duration of symptoms and existence of pathology in intra-operative findings ( $p < 0.001$ ) with greater durations yielding more findings due to ensuing complications as depicted in table 2 below.

**Table 2: Duration of symptoms and intra-operative findings**

DURATION	INTRA-OPERATIVE FINDINGS					Total
	Gangrene	Perforation	Peritonitis	Combination	None	
Within 24 hours	4	6	0	1	0	11
1-3 days	60	11	0	16	32	119
4-7 days	18	13	1	13	26	71
>7 days	1	4	2	4	8	19
<b>Total</b>	<b>83</b>	<b>34</b>	<b>3</b>	<b>34</b>	<b>66</b>	<b>220</b>

Close to two-thirds (65%) of the patients presented with abnormal vital signs in form of increased breathing and heart rates, hypotension or fever. These patients required preoperative resuscitative interventions in form of fluid and drug therapies.

There was a big delay between time of admission and surgery with 35% of them getting operated on more than 24 hours later. Most of the operations were done by consultants with medical officers operating on 25.9% of the patients.

There were significant positive correlations between delay in surgery and complications ( $p = 0.022$ ) as well as duration of stay in the hospital ( $p = 0.001$ ). Table 3 shows the relationship between delay in surgery and the hospital stay.

**Table 3: Effects of delay in surgery on hospital stay**

DELAY	HOSPITAL STAY				Total
	Less than a week	7-10 days	11-14 days	More than two weeks	
Within 6 hrs	6	9	5	4	24
7-12hrs	5	18	5	4	32
13-18hrs	11	18	11	9	49
19-24hrs	6	18	8	6	38
>24hrs	5	27	16	29	77
<b>Total</b>	<b>33</b>	<b>90</b>	<b>45</b>	<b>52</b>	<b>220</b>

Two thirds of those who went home in less than a week had been operated on within 18 hours or less after admission while 55.8% of those who stayed more than two weeks were operated on more than 24 hours after admission.

Ileoileal anastomosis accounted for 40% of the procedures while the rest was shared almost evenly between ileocolic and colocolic anastomoses. Four percent of the patients had more than one kind of anastomosis done. The intra-operative findings and type of anastomosis done are shown in table 4.

**Table 4: Intra-operative findings and type of anastomosis done**

ANASTOMOSIS	INTRA-OPERATIVE FINDINGS					Total
	Gangrene	Perforation	Peritonitis	Combination	None	
Ileoileal	37	16	3	20	12	88
Ileocolic	23	14	0	8	16	61
Colocolic	18	2	0	5	37	62
Multiple	5	2	0	1	1	9
<b>Total</b>	<b>83</b>	<b>34</b>	<b>3</b>	<b>34</b>	<b>66</b>	<b>220</b>

Fifty patients (22.7%) developed post-operative complications such as wound infection, wound dehiscence and burst abdomen. Half of them required reoperation while the rest were managed conservatively. There was a statistically significant correlation between

the type of anastomosis done and post-operative complications ( $p=0.031$ ) with 85.3% involving the ileum.

The duration of patient care in the hospital ranged from 8 hours to 71 days with a mean  $\pm$  standard deviation of  $13.6 \pm 10.4$  days. Forty percent of the patients stayed between 10 – 14 days. The determinants of hospital stay were delay in surgery ( $p=0.001$ ), the kind of anastomosis done ( $p=0.031$ ), and presence of post-operative complications ( $p < 0.001$ ). Multivariate analysis showed postoperative complications as the strongest predictor of hospital stay ( $P=0.025$ ).

Thirty five patients died, giving a 15.9% mortality rate. Fifty nine percent of those who died were found to have a contaminated peritoneum intra-operatively and there was a significant positive correlation between post operative complication and outcome of treatment ( $p=0.030$ ).

## **DISCUSSION**

The ages of the patients varied widely from 2 days to 94 years, reflecting the varied reasons that may necessitate gut resection and anastomosis. The very young ones had congenital anomalies like ileal atresia while the adults had a wide spectrum of causes ranging from trauma to various causes of acute abdomen. The 2.5:1 ratio of males to females is similar to the 2.2:1 found in a study by Chatterjee et al., (2004) in India. Their finding that the majority of patients in need of resection and anastomosis were below forty years of age was similar to ours. Gurvelix in Turkey found a mean of 30 years (Gurlevik and Gurlevik, 1998) that compares well with our 34.2 years.

The causes of gut injury leading to resection and anastomosis may vary from study to study but acute abdomen is dominant in all of them. We found trauma to account for only 5% while Chatterjee et al (2004) had trauma as cause of injury in 19.3% of the cases. The differences may be indicative of regional or environmental factors including violence and road traffic accidents.

With 95% of the patients presenting within days of onset of symptoms, it is no surprise that they would not only present with many complaints but also with deranged vital signs (65%). The resuscitation period ate into the time from admission to operation with 35% of these people undergoing surgery more than 24 hours later. The bad state of the patients

could also explain why consultants did the operation in 75% of the cases. The cumulative effects of the delays were manifested as intraperitoneal contamination which in turn led to the postoperative complications that determined morbidity and mortality in this study. This is in keeping with other studies done in India (Raveenthiran, 2004), Germany (Farthmann et al., 1994), Turkey (Gurlevik and Gurlevik 1998) and U.S.A (Ahrendt et al., 1994).

Morbidity (Wilson and Gollock, 1989, Farthmann et al., 1994). They can range from 15% to 44%<sup>9</sup> and our 22.7% falls within this wide range. We established correlations between postoperative complications and the duration of hospital stay as well as the outcome of intervention just like others before us had done (Ameh et al., 1997, Galland and Spencer, 1986).

A mortality rate of 15.9% fits well in the wide range of 9.7% to 28.2% found in other studies (Morgan et al., 1985, Wilson and Gollock, 1989, Hennekinne-Muci, 2005, Farthmann et al., 1994, Chatterjee et al. 2004). The findings from this study would suggest that the surgical practice of gut resection and anastomosis in Moi Teaching and Referral Hospital (MTRH) compares favourably with other institutions in the world.

### **CONCLUSIONS**

Reasons for gut resection and anastomosis varied in all age groups. The type of anastomosis done determined the postoperative complications which in turn determined the morbidity and mortality of the patients. Despite inordinate delays prior to patient presentation to hospital and the clinical challenges thereof, the MTRH experience with gut resection and anastomosis compares favourably in morbidity and mortality with other institutions in the world.

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### **REFERENCES**

1. Ameh EA, Dogo PM, Attah MM, Nmadu PT (1997). Comparison of three operations for typhoid perforation. *Br J Surg* 84(4): 558-9.



2. Galland RB, Spencer J. (1986). Surgical management of radiation enteritis. *Surgery* 99(2): 133-9.
3. Morgan WP, Jenkins N, Lewis P, Aubrey DA (1985). Management of obstructing carcinoma of the left colon by extended right hemicolectomy. *Am J Surg* 149(3): 327-9.
4. Wilson RG, Gollock JM. (1989). Obstructing carcinoma of the left colon managed by subtotal colectomy. *JR Coll Surg Edinb* 34(1):25-6.
5. Raveenthiran V. (2004). Restorative resection of unprepared left colon in gangrenous vs viable sigmoid volvulus. *Int J Colorectal Dis* 19(3): 258-68.
6. Lukianeko AD, Rukhliada NV, Gaivoronskii IV (2004). Ileoascendoanastomosis. *Vestn Khir Im II Grek* 163(6): 35-8.
7. Hennekinne-Muci S, Tuech JJ, Brehant, Lermite E, Bergamaschi R, Pessaux P, Amaud JP. (2005). Emergency subtotal/total colectomy in the management of obstructed left colon carcinoma. *Int J Colorectal Dis*;14:1-4,
8. Guseinov BN, Lusibov DK, Agaer RM (2003). Surgical strategy for perforating-typhoid ulcers. *Vestn Khir Im II Grek* 162 (4): 80-2.
9. Farthmann EH, Imdahl A, Eggstein S (1994). Radiation enteropathy. *Strahlenther Onkol* 170(8): 437-40.
10. Chatterjee H, Pai D, Jagdish S, Satish N, Jayader D, Srikanthreddy P (2004). Pattern of nontyphoid ileal perforation over three decades in Pondicherry. *Trop Gastroenterol* 24(3):144-7.
11. Gurlevik E, Gurlevik G. (1998). Small bowel volvulus: a common cause of mechanical intestinal obstruction in our region. *Eur J Surg* 164 (1): 51-5.
12. Ahrendt GM, Gardener K, Barbul A. (1994). Loss of colonic structural collagen impairs healing during intraabdominal sepsis. *Arch Surg* 129(11): 1179-83.