SINGLE LAYER VERSUS TWO LAYER INTESTINAL ANASTOMOSIS - A PROSPECTIVE STUDY

MUHAMMAD AYUB, RAUF SHEIKH, SHOAIB GANGAT, ANJUM REHMAN, IQBAL AHMED MEMON
Department of Surgery, Unit II, Dow University of Health Sciences & Civil Hospital, Karachi

ABSTRACT
Objective: *To evaluate the safety of single layer interrupted extra mucosal intestinal anastomosis in comparison with the double layer conventional methods of intestinal anastomosis.*
Study Design: *Case control.*
Setting& Duration: *Surgical Unit II Civil Hospital Karachi from October 2005 to September 2008.*
Methodology: *All patients requiring intestinal anastomosis were included. They were divided into two groups. In-group A single layer interrupted extra mucosal anastomosis was done with 2/0 vicryl while in-group B conventional double-layered anastomosis with 2/0 vicryl was made. Outcome of the two techniques in terms of morbidity, mortality and cost effectivity was compared.*
Results: *Ninety patients were included in our study (42 in group A and 48 in group B). Mean age for group A was 37.5years and group B 40.2 years respectively. Entero-enterostomy, entero-colostomy and colo-colostomy were done in 30(71.4%), 10(23.8%) and 2(4.7%) patients in-group A and 35(72.9%), 10(20.8%) and 3(6.3%) patients in group B respectively. Two patients (4.7%) in group A and four patients (8.3%) among group B developed anastomotic leakage with overall mortality 0% in group A and 4.1% in group B.*
Conclusion: *A single layer interrupted extra mucosal intestinal anastomosis can be constructed in less time with minimal complication compared with two-layered technique. It can be safely introduced into surgical training programme.*

KEY WORDS: *Anastomosis, Leak, single layer interrupted, morbidity and mortality*

INTRODUCTION

Fundamental principles of intestinal anastomosis were established more than 100 years ago and have undergone modifications with the passage of time.[1] In 1926 Lembert described a suturing technique in which serosal apposition was done. Senn described two layered interrupted anastomosis while Halsted advocated one layer anastomosis.[2] Number of techniques have been devised at different times yet there is no single technique which is internationally accepted.[3] The objections against double layered anastomosis is that in most of the cases it fails to oppose clean serosal surfaces and it results in large amount of ischemic tissue within suture line which increases the chances of leakage. Further excessive inversion leads to narrowing of lumen.[4] In contrast single layer anastomosis causes least damage to sub mucosal vascular plexus least chances of narrowing of lumen, incorporates strongest sub mucosal layer and accurate tissue apposition.[5] this prospective comparative study was performed to evaluate the safety of single layer interrupted extra mucosal technique.

METHODOLOGY

This prospective study was conducted from October 2005 to September 2008 at Surgical Unit II Civil Hospital Karachi. All patients requiring intestinal anastomosis were included but those who needed anastomosis to the stomach, duodenum and rectum were excluded. Patients were randomly assigned to one or two layer techniques.

Correspondence:
Dr. Muhammad Ayub, Registrar, Surgical Unit II,
Dow University of Health Sciences &
Civil Hospital, Karachi.
Phones: 021-9215740, 0300-3928520.
E-mail: mohammad.ayub@yahoo.com

Total of ninety patients were included in this study. They were divided into two groups A and B in-group A, 42 patients were included in whom single layer interrupted extra mucosal anastomosis was done with 2/0 vicryl. In-group B 48 patients underwent conventional double layered anastomosis with 2/0 vicryl. All patients were operated by same group of surgeons and senior residents assisted by an attending surgeon. Post operatively same group (Cefotaxime and Metronidazole) of antibiotics was used in both groups for 5 days. The outcome after two techniques in terms of morbidity, mortality and cost effectivity was compared.

RESULTS

Group A (single layered) and group B (double layered) were evenly matched by age, sex, diagnosis and location of anastomosis (Table I). The mean age for group A was 37.5 (range 16-68) years and for group B was 40.2 (range 15-69) years. Sex distribution was 30 males and 12 females in group A while in group B 32 males and 16 females.

In our study, overall anastomotic leakage was noticed in 6 patients (8.9%). Two patients in group A developed leakage, responded well to conservative management while in group B , four patients developed leakage, out of those two responded to conservative management, two developed fecal fistula (one patient re explored and stomal diversion was made and the other died due to sepsis). One more patient belonging to group B died due to intra abdominal abscess, sepsis and multi organ failure (Table II). Length of hospital stay was 8.2 days for group A while it was 10.5 days for group B. There was no mortality in group A while two patients (4.1%) died due to complications.

Table I. Size of abscess and treatment

	Group A (One Layer)	Group B (Two Layer)
Number of Anastomosis	42	48
Age Years	37	40
Sex Male, Female	30/12	32/16
Diagnosis		
Trauma RTA/Gunshot	9	8
Inflammatory (T.B)	16	22
Malignancy (Cancer)	4	6
Ileostomy Closure	11	9
Colostomy Closure	2	3
Location		
Enterocenterostomy	30	35
Enterocolostomy	10	10
Colocolostomy	2	3

DISCUSSION

The present study assessed the efficacy and safety of single and two-layered anastomosis after intestinal resection. Generally conventional two-layered technique is being practiced, but this causes excessive mucosal inversion, may cause narrowing of lumen and may lead to ischemia of anastomotic site.[6] To overcome this problem extra mucosal interrupted suturing technique was tried. It has the advantage of good opposition of serosal surfaces, no luminal narrowing and less damage to sub mucosal vascular plexus.[7] In this study anastomotic leakage in group A was 4.7%. It is consistent with the other studies which shows leakage in the range of 1.3-7.7%.[8] Among group B, this study shows anastomotic leakage around 8.3% which is quite high than the rate described in the literature.[8,9,10] Mortality in-group A is 0% while in-group B it is 4.1%. Again it is consistent with that described in the literature.[11] Safety and minimal complication of single layer extra mucosal anastomosis over the other anastomotic techniques was appreciated by an audit published in BJS in 1991.[12]

CONCLUSION

Extra mucosal single layered anastomosis is one of the promising techniques with negligible complications and marked advantages.

REFERENCES

1. Irvin T I. Techniques of anastomosis in GIT surgery. In Dudely H eds. Rob and Smith Atlas of General Surgery, 3rd edition, 1986; 235.

2. Russell R C G, Williams N S, Bulstrode C J K. Anastomosis. In: Bailey and Love short practice of surgery, 25th ed. London: Amlod, 2008; 242-45.

Table II. Post-operative complications

Complications	Group A (n=42)	Group B (n=48)
Wound Infection	3(7.1%)	5(10.4%)
Wound Dehiscence	--	3(6.2%)
Anastomotic Leaks	2(4.7%)	4(8.3%)
Intra Abdominal Abscesses	2(4.7%)	3(6.2%)

3. O, Kelly T J, Krukowski Z H, Intestinal anastomosis. Surgery 1999; 46: 197-200.

4. Carty N J, Keating J, Campbell J, Karanjia N, Heald R J. Prospective audit of an extra mucosal technique for intestinal anastomosis. Br Journ Surg 1991; 78: 1439-41.

5. Hirata-K, Konishi T, Ueda Y, Kurosaki S. Healing in intestinal anastomosis- Comparison of the Albert Lambert and Gambee methods. Sangyo Ika Dai Zasshi 2000; 22(1): 1.

6. Nelson R L. Surgical techniques and care of obstruction of small bowel. Nyhus LM, Baker RJ(ed) Mastery of surgery. 2nd Edi. Chicago: Catherine MA 1992; 1151-61.

7. Singh B, Singh J. Evaluation of single layer intestinal anastomosis; an experimental study. Aust N Z J Surg 1975; 45: 102.

8. Bursch J M, Françoise R J, Moore E E, Biffi W L. Single layer continuous versus double layered interrupted Intestinal anastomosis; a prospective randomized trial. Ann Surg 2000; 231: 832.

9. Maurya S D, Gupta H C, Tewari A, Khan S S. Double layer versus single layer Intestinal anastomosis: a clinical trial Int Surg1984; 69: 339.

10. Pickleman J, Watson W, Cunningham J, Fisher S G, Gamelli R. The failed gastrointestinal anastomosis; an inevitable catastrophe. J Am Coll Surg 1999; 188: 473.

11. Alves A, Panis Y, Trancart D, Regimbeau J M. Factors associated with clinically significant anastomotic leakage after large bowel resection; multivariate analysis of 707 patients. World Journ Surg 2002; 26: 499.

12. Carty N J, Keating J, Cambell J, Karanigia N and Heald R J. Prospective audit of an extra mucosal techiquefor intestinal anastomosis Br Journ Surg 1991; 78: 1439-41.