RESEARCH ARTICLE

EFFECTS OF BLOOD TRANSFUSION ON GASTROINTESTINAL ANASTOMOSIS – OUR EXPERIENCE IN 52 PATIENTS

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ABSTRACT

Background: Patients, operative technique and instrumental factors, all affect the intestinal anastomosis outcome. Preoperative, intraoperative and postoperative blood transfusion influences the very common surgical procedure. Blood transfusion is discriminated from other risk factors in that; its intentionally added risk factor.

Aims & Objective: The effect of intra-operative and post-operative blood transfusion on elective gastrointestinal anastomosis mainly evaluated by following factors; (1) surgical site complications (2) anastomosis leak (3) faecal fistula and (4) death.

Material and Methods: To evaluate the effect of blood transfusion (Intraoperative and Postoperative) in outcome of Gastrointestinal anastomosis at Government General Hospital. Data collected from fifty two patients who underwent elective gastro intestinal anastomosis at our hospital.

Results: The total number of patients was 52, 28male and 24 female. Mean age was 43 years, 17.3% were underwent small bowel anastomosis, 83.7% were underwent large bowel anastomosis, and 15.38% were transfused intraoperative and 26.92% were transfused postoperatively. Regardless other risk factors the incidence of surgical site infection was significantly high in transfused patients (25%), also there was a high rate of other complications in transfused patients.

Conclusion: Intraoperative and post-operative blood transfusion is a good predictor for development of complications in elective intestinal anastomosis. There were some limitations in this study, as other risk factors might change the outcome and the effect of blood amount wasn't considered, so more precise studies have to be done to give more support to our results.

KEY-WORDS: Blood Transfusion; Elective Gastrointestinal Anastomosis; Anastomosis Leak

Introduction

Most common operative procedure in a surgical operation theatre is Intestinal anastomosis. There are many indications[1] for intestinal anastomosis like Intestinal tumours – benign or malignant, intestinal tuberculosis, reversal of stoma, Crohn's disease, traumatic injury to small or large bowel, ischemic bowel disease etc. Intestinal anastomosis is performed either in emergency or elective laparotomy. There are ways[2] to perform bowel anastomosis; it can be performed hand sewn or stapled, single layer or double layer. As there are many ways in performing, there are many factors[3] which affect the healing of the intestinal anastomosis like anaemia, diabetes mellitus, previous irradiation or chemotherapy, malnutrition with hypoalbuminemia, vitamin deficiencies, steroid use, type and location where anastomosis is being done. As stated above anaemia also affect the intestinal anastomosis, blood transfusion is important factor in healing of anastomosis. This is the study of 52 patients who were undergone intestinal anastomosis who were given intra-operative and or post-operative blood transfusion. The effect of blood transfusion on the outcome of patients was studied. Testini et al study[4] found that; preoperative blood transfusion a causative factor in development of anastomosis leak. Also some study found that; high rate of complications related to massive blood transfusion in emergencies.[5] Nevertheless blood transfusions are frequently required in gastrointestinal surgery to correct anemia or because of excessive blood loss from associated trauma or operative procedures.[6] Thus, it is important to establish the effect of such transfusions on intestinal repair.

Materials and Methods

This was a prospective descriptive hospital base clinical study, in the period from 1st June 2011 to 31st May 2012. A total of fifty two patients underwent elective gastrointestinal anastomosis, by general surgical units were enrolled in the study after informed consent. All large bowel anastomosis were preceded by bowel preparation[7], and all patients received single prophylactic dose of antibiotic, followed by a therapeutic course in postoperative period[8]. Data was collected by structure questionnaire for each patient, from the date of operation till discharge from the hospital and for outpatient follow up for presence of complications, for at least first outpatient visit. Patients were selected randomly for this study whose preoperative haemoglobin was below 8 mg%. Patients aged below twelve years, or had severe comorbidities were excluded from the study. The outcome of patients was studied on basis of complications like surgical site complications, anastomosis leak, faecal fistula and death.

Results

Data analysis of fifty two patients was done, all patients were underwent open, hand sewn elective intestinal anastomosis. 53.84% were male and 46.16% were female, mean age was 43 years (±15.17) and rang from 28 to 65 years (table 1). The indication of anastomosis was resection of bowel tumours in 23.07% of patients; one was small bowel and 11 were large bowel tumours. In 30.77% the indication was reversal of stoma; twelve were colostomies and four were ileostomies which was the commonest indication (table 2). The commonest anastomosis was Enterocolic variety. In 67.3 % (n=35) of anastomosis were accomplished by double layer technique and 32.7 % (n=17) by single layer. The suture material was polyglycolic acid and needle was round bodied in all anastomosis (table 3). The blood transfusion was given to all patients whose haemoglobin was ≤ 8 mg % (table 4). The incidence of surgical site infection was 13.46% (n=7), AL 9.6% (n=5), fistula 2.6%, and death 1.9%. All intraabdominal complications were developed in patients who were transfused intraoperative (n=3) and postoperatively (n= 12). Drainage of peritoneal cavity was done in 92% of operations, and all had nasogastric tube (NGT) decompression (table 5).

Table-1: Age and Gender Distribution

Age (Years)	Male	Female
25-40	8	2
41-55	12	7
>55	08	5

Table-2: Indication for Intestinal Anastomosis

Indication	No. of Patients
Intestinal Tumors	12
Crohn's Disease	2
Reversal of Stoma	16
Small Bowel Fistula (Post perforation Closure)	10
Ileocaecal Tuberculosis	12

Table-3: Type of Anastomosis

Type of Anastomosis	No. of Patients (%)
Enteroenteric	17.31
Enterocolic	50.00
Colocolic	32.69

Table-4: Patients Given Blood Transfusion

Blood Transfusion	No. of Patients
Pre-operative	15
Post-operative	38

Table-5: Anastomosis and Complications

Type of Anastomosis	Complications			
	Surgical Site Infection	Anastomosis Leak	Faecal Fistula	Death
Enteroenteric	0	0	7	0
Enterocolic	4	2	1	0
Colocolic	9	7	4	1

Discussion

ABO group is the greatest discovery and blood transfusion has become a common treatment for anemia and acute blood loss.[9] Its adverse effects had been notice in last decades, especially the immunosuppression.[10] Blood transfusion alters both local and systemic immune response to injury.[11] It impairs lymphocyte and macrophage function, blastogenesis and interaction with other cells. Allogeneic leukocytes have a critical role in the induction of transfusion-induced immunosuppression, also it decrease the production of interleukin - 2 (IL2) which found to be an important factor in cell immunity and stimulation of healing.[12] These effects can be reverse by administration of exogenous IL2 in chronic healing, also some studies found that leucocytes-depleted blood doesn't impair

healing.[13] In bowel anastomosis blood transfusion increase incidence of abscess formation, reduce collagen synthesis result in impair anastomotic strength, and high rate of anastomotic leak.[14] Some studies[15] reported that this effect related to intra and postoperative blood transfusion rather than preoperative transfusion, implies that its effect might be at least partially surrogated by other intraoperative factors, such as contamination and shock.[16] The effect of blood transfusion in outcome of bowel anastomosis has been investigated by many studies[17], which proved its adverse impact in healing process and immunity of the host, that result in high rate of infectious complications and leakage, but it's necessary in certain circumstances such as shock and massive resection etc.[18] In this study all seven surgical site infections were developed in 13.47% of patients which was quite high. Anastomosis leak rate was 10% and faecal fistula was in 10% of patients which were also high. In some studies[19] the amount of blood found to be the risk(massive blood transfusion), rather than transfusion itself, unfortunately in this study there weren't considered neither the amount of blood nor intra operative haemorrhage and degree as a separate risk factors for development of complications. Intraoperative contamination was found to be high about 21.7%, which added a burden into this group. In Ketan et al[20] study all anastomosis leaks were developed in transfused patients. Lujan et al study[21] found that surgical site infection and intraoperative and postoperative blood transfusions were also associated with significantly higher rates of anastomosis leak in this study Enteroenteric anastomosis wasn't developed any complications, concluded the adverse effect of blood transfusion is more obvious in large bowel procedures than small bowel, this evidence was supported by Reiping et al[22] study in large bowel anastomosis. This study concluded that blood transfusion is risk factor for surgical site infection regardless the site of anastomosis in large bowel procedures. The hospital stay period was prolonged in all patients as there were increase rate of complications. There were some limitations in this study, as other risk factors might change the outcome and the effect of blood amount wasn't considered, so more precise studies have to be done to give more support to our results.

Conclusion

Intraoperative and Postoperative blood transfusion have adverse effects on elective intestinal anastomosis, significantly increase rate of surgical site infection, but regarding anastomosis leak and faecal fistula, post-operative blood transfusion has more adverse effects.

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