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ORIGINAL ARTICLE

Efficacy of Tranexamic Acid in Laproscopic Cholecystectomy

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***ABSTRACT*:**
Background: Laparoscopic cholecystectomy has established itself firmly as the "gold standard" for the treatment of gallstone disease. The present study was conducted to determine the role of tranexamic acid in controlling blood loss in laparoscopic cholecystectomy. **Materials & Methods:** The present study was conducted in the department of general surgery on 40 patients who complaint of cholelithiasis and underwent laparoscopic cholecystectomy. Patients were divided into 2 groups. Group I received intravenous dose 20 mg/kg of tranexamic acid at induction of anesthesia. Group II did not receive any tranexamic acid. Medical history such as any drug intake ie anticoagulants, antifibrinolytics and antiplatelets were taken. Patients were subjected to estimation of hemoglobin (Hb), TLC, DLC, CT FBS, liver function tests, urine complete examination, and abdominal Ultrasonography (USG). **Results:** Out of 40 patients, group I had 20 and group II had 20 patients. The difference was non- significant (P-1). Group I had 7 males and 13 females while group II had 6 males and 14 females. The difference was significant (P-0.02). The mean postoperative hospital stay, drain fluid Hb, drain fluid hematocrit, drain fluid output, mean pulse rate at the start of surgery, mean pulse rate 24 h after surgery, and mean change in Hb in both groups were not significant (P>0.05). Common comorbidities in patients was smoking (group I-1, group II-2), hypertension (group I-2, group II-3), diabetes (group I-1, group II-2), alcoholic (group I-3, group II-4) and drug addiction (group I-1, group II-1). The difference was non- significant (P>0.05). **Conclusion:** Laproscopic cholecystectomy is widely used surgical procedure in cases of cholelithiasis. The blood loss is can be managed by use of tranexamic acid. However, the difference in both group was non- significant.
Key words: Hypertension, Laproscopic cholecystectomy, Tranexamic acid.

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INTRODUCTION

Laparoscopic cholecystectomy has now replaced open cholecystectomy as the first-choice of treatment for gallstones and inflammation of the gallbladder unless there are contraindications to the laparoscopic approach. This is because open surgery leaves the patient more prone to infection. Sometimes, a laparoscopic cholecystectomy will be converted to an open cholecystectomy for technical reasons or safety.[1]

Laparoscopic cholecystectomy has established itself firmly as the "gold standard" for the treatment of gallstone disease. Existing literature has focused most exclusively on the biliary complications of this procedure, but other complications such as significant hemorrhage during laparoscopic cholecystectomy have not been documented.[2]

Laparoscopic cholecystectomy requires several (usually 4) small incisions in the abdomen to allow the insertion of operating ports, small cylindrical tubes approximately 5 to 10 mm in diameter, through which surgical instruments and a video camera are placed into the abdominal cavity. The camera illuminates the surgical field and sends a magnified image from inside the body to a video monitor, giving the surgeon a close-up view of the organs and tissues. The surgeon watches the monitor and performs the operation by manipulating the surgical instruments through the operating ports.[3]

Tranexamic acid was discovered in 1962 by Utako Okamoto. It is on the World Health Organization's List of Essential Medicines, the most effective and safe medicines needed in a health system. Tranexamic acid is available as a generic medication. Tranexamic acid (TXA) is a medication used to treat or prevent excessive blood loss from major trauma, post partum bleeding, surgery, tooth removal, nose bleeds, and heavy menstruation. It is also used for hereditary angioedema. It is taken either by mouth or injection into a vein.[4]

Tranexamic acid is a synthetic antifibrinolytic drug released in 1970. The mechanism of action for synthetic antifibrinolytics is competitive blockade of the lysine‑binding sites of plasminogen, plasmin, and tissue plasminogen activator. The reversible blockade impedes fibrinolysis and blood clot degradation.[5] The present study was conducted to determine the role of tranexamic acid in controlling blood loss in laparoscopic cholecystectomy.

MATERIALS & METHODS

The present study was conducted in the department of general surgery. It included 40 patients who complaint of cholelithiasis and underwent laparoscopic cholecystectomy. Patients with bleeding disorders, clotting abnormalities, or on anticoagulants, hypertension, cirrhosis and bleeding due to trocar injury to major blood vessels were excluded. All were informed regarding the study and written consent was obtained. Ethical clearance was taken from institute ethical committee.

Patients were divided into 2 groups. Group I received intravenous dose 20 mg/kg of tranexamic acid at induction of anesthesia. Group II did not receive any tranexamic acid. All cases were performed by laparoscopic surgeons.

General information such as name, age, gender, clinical history and examination was done. Medical history such as any drug intake ie anticoagulants, antifibrinolytics and antiplatelets were taken. Patients were subjected to estimation of hemoglobin (Hb), TLC, DLC, CT FBS, liver function tests, urine complete examination, and abdominal Ultrasonography (USG).

The standard 4‑port laparoscopic cholecystectomy was performed in each case. The cystic artery and duct were clipped with liga clips and divided. After extraction of the gallbladder, 100 ml of normal saline was instilled into peritoneal cavity (subhepatic space), and a closed drain was inserted. Ports were closed in a standard fashion.

Heart rate and blood pressure were checked at 1 h, 24 h, and 48 h after surgery. Drain output was recorded daily, and drain fluid hematocrit and hemoglobin were performed after 48 h, and all the patients were followed up daily postoperatively till discharged. Hb level was performed after 48 h and was compared with the preoperative levels.

Results thus obtained were subjected to statistical analysis using chi-m square test. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 40		
Group I	Group II	P value
20	20	1

Table I shows that out of 40 patients, group I had 20 and group II had 20 patients. The difference was non- significant (P-1).

Table II Gender wise distribution of patients

Groups	Males	Females	P value
Group I	7	13	0.02
Group II	6	14	

Table II shows that group I had 7 males and 13 females while group II had 6 males and 14 females. The difference was significant (P-0.02).

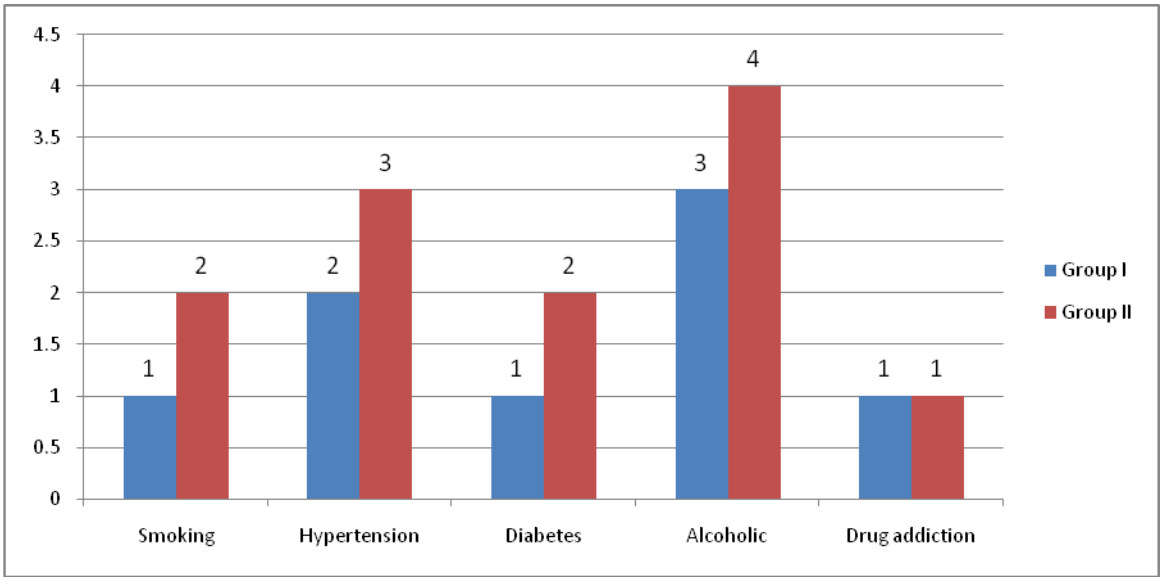
Table III Demographic data of patients

Parameters	Group I	Group II	P value
Hospital stay (days)	2.2	2.3	0.1
Drain fluid Hb (gm%)	0.81	0.92	0.3
Drain fluid hematocrit	0.25	0.26	0.7
Drain fluid output	85	88	1
Mean pulse rate (start of surgery)	75.4	76.0	0.21
Mean pulse rate (24 h after surgery)	75.8	76.6	1
Mean change in Hb (gm%)	0.25	0.27	1

Table III shows that the mean postoperative hospital stay, drain fluid Hb, drain fluid hematocrit, drain fluid output, mean pulse rate at the start of surgery, mean pulse rate 24 h after surgery, and mean change in Hb in both groups were not significant (P>0.05).

. Laproscopic cholecystectomy.

Graph I Comorbidities in patients



Graph I shows that common comorbidities in patients was smoking (group I-1, group II-2), hypertension (group I-2, group II-3), diabetes (group I-1, group II-2), alcoholic (group I-3, group II-4) and drug addiction (group I-1, group II-1). The difference was non- significant (P>0.05).

DISCUSSION

Plasmin inhibition by tranexamic acid may also help prevent platelet degradation. The half‑life of tranexamic acid is approximately 80 min, provided there is normal renal function. Intravenous administration of tranexamic acid has been routinely used for many years to reduce hemorrhage during and after surgical procedures such as coronary artery bypass and scoliosis surgery. Tranexamic acid has been found to be very useful in reducing blood loss and the incidence of blood transfusion in these surgeries.[6] The present study was conducted to determine the role of tranexamic acid in controlling blood loss in laparoscopic cholecystectomy.

We divided patients into 2 groups. Group I received intravenous dose 20 mg/kg of tranexamic acid at induction of anesthesia. Group II did not receive any tranexamic acid. Both groups had 20 patients each. Group I had 7 males and 13 females while group II had 6 males and 14 females. This is similar to Underwood et al.[7] We found that the mean postoperative hospital stay, drain fluid Hb, drain fluid hematocrit, drain fluid output, mean pulse rate at the start of surgery, mean pulse rate 24 h after surgery, and mean change in Hb in both groups were not significant (P>0.05). Gohel M[8] in his study found similar results.

Tranexamic acid exerts its antifibrinolytic effect by blocking lysine‑binding locus of plasminogen and plasmin molecules, thereby preventing the binding of plasminogen and plasmin to the fibrin substrate. Tranexamic acid also inhibits conversion of plasminogen to plasmin by plasminogen activators. It has been used in the treatment of bleeding for many years.

Tranexamic acid is a synthetic analog of the amino acid lysine. It serves as an antifibrinolytic by reversibly binding four to five lysine receptor sites on plasminogen or plasmin. This prevents plasmin (antiplasmin) from binding to and degrading fibrin and preserves the framework of fibrin's matrix structure. Tranexamic acid has roughly eight times the antifibrinolytic activity of an older analogue, ε-aminocaproic acid.[9]

We observed that common comorbidities in patients were smoking, hypertension, diabetes, alcoholic abuse and drug addiction. The difference in both groups was non-significant. This is in agreement to Gordan.[10]

Common side effects of tranaxamic acid are headaches (50.4 – 60.4%), Back aches (20.7 – 31.4%), nasal sinus problem (25.4%), abdominal pain (12 – 19.8%), diarrhea (12.2%), fatigue (5.2%) and anemia (5.6%).

CONCLUSION

Laproscopic cholecystectomy is widely used surgical procedure in cases of cholelithiasis. The blood loss is can be managed by use of tranexamic acid. However, the difference in both group was non- significant.

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