

Seroma Reduction and Role of Tranexamic Acid in Ventral Hernia Repair

Hassan Ahmed,^{1*} Surrendar Dawani,¹ Shahid Rasul,¹ Salman Jafferi,¹

ABSTRACT

Objective To evaluate the role of tranexamic acid in seroma reduction in ventral hernia repair.

Study design Cross sectional study.

Place & Duration of study Department of Surgery, Ward 21, Jinnah Postgraduate Medical Center (JPMC) Karachi, from July 2019 to February 2020.

Methodology All patients with ventral abdominal hernia were included in the study. Patients suffering from liver cirrhosis, strangulated hernias, uncontrolled diabetes and bleeding disorders were excluded. Patients on anticoagulants were advised to stop the medications five days prior to surgery. A detailed history, clinical examination and routine biochemical investigations were done. Ultrasound of abdomen and pelvis was done to find out the actual size of the defect and status of abdominal viscera. Anesthesia consult was obtained. Study was approved by institution review board and informed consent was obtained from the patients. Standard onlay mesh repair surgery was performed according to the size of defect. Tranexamic acid was given postoperatively in all patients. Drains were placed to record the volume of seroma after surgery.

Results Total of eighty patients were included in this study. Twenty (25%) patients were male and sixty (75%) females. Age of the patients was from 20 years to 60 years. Average age was 45 year. In sixty-five (81%) patients seroma subsided within 5 days, where as in fifteen (19%) patients it took more than five days to stop. There was no statistically significant effect of age and gender on the seroma formation with $P=0.179$ and $P=0.627$ respectively.

Conclusion Tranexamic acid is effective in reducing the seroma formation in postoperative period in ventral hernia repairs.

Key words Tranexamic acid, Fibrinolysis, Plasminogen, Seroma.

INTRODUCTION:

Abdominal Hernia is defined as the bulging of part or whole of the contents of abdominal cavity through the weakened part of abdomen. Mostly intestines or omentum come out of abdominal wall defect resulting

in hernias. These hernias can occur anywhere in abdomen between chest and hips. Hernia repair is the common procedure performed in surgical practice.¹ Patients undergoing major surgeries like abdominal hernia mesh repair are at increased risk of developing seroma. Apart from this, other risk factors include age, amount of tissue dissection, use of anticoagulants and previous history of surgeries and seroma formation.²

¹ Department of Surgery W-21 Jinnah Postgraduate Medical Centre Karachi.

Correspondence:

Dr. Hassan Ahmed ^{1*}
Department of Surgery W-21
Jinnah Postgraduate Medical Centre
Karachi
E mail: hahmed52@gmail.com

A seroma is simply defined as the collection of fluid occurring after any surgical procedure. This fluid is called serum and it results from leakage through damaged blood vessels and lymphatics. The seroma formation is commonly associated with the risk of

infection and breakdown of surgical repair. Suctions drains are commonly used to evacuate them. These drains assist in monitoring of any collection in the closed cavity.³ Postoperative seroma formation occurs in 5.6% to 42% of cases when mesh is used in abdominal hernia repair.⁴

A seroma appears as swelling under the skin at the site of surgery. The fluid is either clear or yellow in appearance.⁵ If the seroma gets infected, the discharge may change its color and become blood stained or purulent.⁶ The minimal collections often resolve on conservative treatment but larger ones need either needle aspiration and rarely open drainage.⁷ The use of mesh in hernia repair builds up the fluid. The larger the area of repair with mesh, the higher the risk of seroma formation and its complications. The seroma formation can be prevented by use of tranexamic acid.⁸

Tranexamic acid is a synthetic derivative of the amino acid lysine that produces an anti-fibrinolytic action which prevents and treats excessive bleeding occurring in primary or secondary stages of wound healing. When fibrinolysis exceeds coagulation, surgical bleeding can ensue despite proper application of bleeding control methods. Tranexamic acid is given to inhibit the process of fibrinolysis. It prevents the activation of plasminogen to plasmin. Its use can decrease postoperative bleeding by 34%.^{9,10} The rationale of our study was to find out the role of tranexamic acid in prevention of seroma after mesh repair.

METHODOLOGY:

This study was conducted at the Department of Surgery, Ward 21 JPMC Karachi. This was a cross sectional study done from July 2019 to February 2020. All the patients admitted from surgical OPD with the diagnosis of ventral abdominal hernia were included. Patients suffering from uncontrolled diabetes mellitus, cirrhosis, bleeding disorders and those with strangulated hernias were excluded. Patients taking anticoagulants were advised to stop that drug five days prior to surgery.

A detailed clinical history was taken and examination performed. Anesthesia and surgery related laboratory investigations were carried out. Ultrasound of abdomen and pelvis was done to estimate the size of defect along with its contents. Anesthesia fitness and informed consent were taken. All patients received the standard surgical onlay mesh repair. Vacuum drain was placed to monitor the volume of seroma. Postoperatively IV tranexamic acid 1gm stat was given at the closure of skin and then 500 mg by oral route 12 hourly till the 5th postoperative day. Daily drain output was documented. Drain was removed on 5th postoperative day or when wound drainage was less than 30ml in 24 hours. Descriptive statistics were used to present numerical and categorical data. Stratification of results was done according to the age and gender. Post stratification Chi-square test was used for statistical significance. A P value of < 0.05 was taken as significant.

RESULTS:

A total of eighty patients were included in this study. There were 20 (25%) male and 60 (75%) female patients. The age of the patients was from 20 years to 60 years. Average age was 45 years. Ten (12.5%) patients aged 20 year to 30 years, 20 (25%) from 31 years to 40 years and 30 (37.5%) from 41 years to 50 years. Patients were stratified according to age and gender to find out the effect of these variables on seroma formation. There was no significant difference noted in relation to age (P=0.179) and gender (P= 0.627) as shown in table I.

Postoperatively 65 (81%) patients developed seroma which resolved within five days (mean volume of fluid - 74.00+35.92 ml) where as in fifteen (19%) patients it subsided in more than five days (mean volume 130.00+ 55.96 ml). This is given in table II.

DISCUSSION:

A hernia can occur at different locations of the body. These defects most commonly involve the abdominal wall.¹¹ Ventral abdominal hernias are simply defined as non-inguinal and non-hiatal defect in the fascia of the abdominal wall. Hernia repair is one of the most commonly performed operations

Table I: Seroma Formation In Relation To Effect Modifiers Age and Gender

Effect Modifier	Group Stratification	Number of Patients	Mean + SD	P- value
Age (years)	20-40	30	80.05+40.76	P=0.179
	41-60	50	108.97+ 59.96	
Gender	Male	20	96.00+ 34.34	P=0.627
	Female	60	104.00+59.93	

Table II: Seroma Reduction in Terms of Postoperative Days

	Postoperative Days	No of Patients	Percentage	Amount of Seroma Mean + SD
n=80	Less than 5 days	65	81%	74.00+35.92
	More than 5 days	15	19%	130.00+ 55.96

world-wide accounting for 10 to 15% of all surgical procedures.¹² The risk to develop hernia after laparotomy is 10%, after muscle-splitting incision 5% and less than 1% following laparoscopic repair.

Seromas are common and usually occur after different types of hernia repair especially those that are large and involve significant tissue disruption. The exact etiology of seroma formation remains controversial but it is considered to be the collection of liquefied fat, serum, inflammatory exudates and lymphatic fluid under skin flap. The amount and duration of seroma formation varies and influenced by many factors like extent of dissection and method of raising the skin flap such as electrocautery or knife. Untreated seromas commonly become infected.¹³

Seroma enormously enhances the chances of wound infection. It is the good culture medium for the proliferation of bacteria and results in dangerous complications like wound dehiscence and septicemia. In our study seroma was common complication of hernia repair. The studies done by other authors on the evaluation of risk factors that could lead to seroma formation showed no impact of age and gender on seroma formation. Same was observed in our study.^{14,15,16}

Anti-fibrinolytic drug tranexamic acid has been found effective in decreasing the postoperative soakage, seroma and serous fluid formation. According to studies it increases wound healing. In our study, tranexamic acid has also proved effective in reducing the amount of seroma. A randomized double-blind trial has reported that use of tranexamic acid 1 g daily significantly reduced the mean postoperative drainage volume and mean duration of hospital stay was also short. In our study, the mean duration of seroma was 10 days in majority of the patients. Tranexamic acid seems to be the independent factor in reducing the total amount of seroma formation. This is the main strength of this study, however our study lacks a comparison to a control group.

CONCLUSIONS:

Tranexamic acid helped in decreasing the volume of seroma formation in ventral hernias operations postoperatively. This may prevent complications like

wound infection and dehiscence.

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