

## Tranexamic acid role in prevention of seroma formation after ventral herioplasty: A cross-sectional study

Dr. Bezan Baloch<sup>1</sup>, Dr. Abdullah Khan<sup>2</sup>, Dr. Saiqa Rafiq<sup>3</sup>, Dr. Khawar Iqbal<sup>4</sup>, Dr. Hazratullah<sup>5</sup>, Dr. Nazia Naseer<sup>6</sup>

<sup>1</sup>Associate professor of surgery department Bolan medical college Quetta

<sup>2</sup>Associate Professor General Surgery Department, Bolan medical college Quetta

<sup>3</sup>Senior registrar, Mekran medical college Turbat

<sup>4</sup>Senior registrar, surgery department Bolan medical college Quetta

<sup>5</sup>Senior registrar, General surgery department, Bolan Medical College, Quetta Balochistan

<sup>6</sup>Assistant professor, Mekran medical college Turbat

### Corresponding Author:

Dr. Bezan Baloch

Associate professor of surgery department Bolan medical college Quetta

Email: bezanbaloch@yahoo.com

### Abstract:

**Objective:** The aim of this study was to explore the role of tranexamic acid in prevention of seroma formation after ventral herioplasty.

**Materials and method:** The present cross-sectional study was carried out at the department of General Surgery Department, Bolan medical college Quetta from November 2025 to April 2026 after taking permission from the research team of the hospital. Non-probability consecutive sampling approach was used for sample collection. A total of 100 individuals of both genders and different age group (ranged 21-61 years) diagnosed with ventral hernia repair were included while individuals who had bleeding disorders, strangled hernias cirrhosis and uncontrolled diabetes mellitus excluded. Anticoagulant medication had to be discontinued five days before to surgery by the participants. Clinical history and laboratory results were documented. Using pelvic and abdominal ultrasonography, the defect's size and content were assessed. All individuals were treated with the standard-only mesh. A vacuum drain was used to measure the seroma's volume. One gram of intravenous tranexamic acid was administered following skin closure, and 500 mg of oral tranexamic acid was administered for 12 hours on the 5th post-operative day. On daily basis the drain output was recorded. When the output was less than 30 milliliters per day, the drain was removed. Descriptive statistics were used to show numerical and categorical data. The results were categorized based on age and gender. To determine statistical significance the Chi-square test was employed. P-values less than .05 were regarded as statistically significant.

**Results:** A total of 100 individuals participated in this study out of which 70(70%) were females and 30 (30%) were males. The mean age of the study participants was 81.05±41.75 years. Out of the total participants 12(12%) 21-32 years old, 26 (26%) were between the ages of 33 and 41, and 38 (38%) were between the ages of 42 and 61 years. Participants were categorized based on these factors in order to ascertain the effect of age and gender on seroma development as presented in table 1. In 84 individuals (84%) the seroma resolved within five days after surgery, but in 16 individuals (16%) it took longer than five day.

**Conclusion:** The current study concluded that Tranexamic acid significantly lowers the development of for seromas following surgery ventral hernia repair.

**Key Words:** ventral hernia repair, seromas, tranexamic acid

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## Introduction

The bulging of all or part of the contents of the abdominal cavity due to a weakening in the abdominal wall is known as an abdominal hernia.<sup>1-3</sup> A non-inguinal, non-hiatal defect in the abdominal wall's fascia is known as ventral hernia. Approximately 350,000 ventral hernia procedures are performed each year. General surgeons frequently operate to fix these abnormalities in the abdominal wall. Surgery is usually advised for those with symptomatic hernias, acceptable surgical risk, or those who are more likely to experience hernia-related complications. Someone may have an impact on a person's quality of life, result in hospital stays, or even cause death in certain situations. The most common surgery done globally is hernia repair. 10–14%.<sup>4</sup> There are two primary types of ventral hernia that are acquired and congenital. Although the great majority of hernias seen and treated by general surgeons are acquired, some people have ventral hernias from birth and live with them for extended periods of time before having them surgically fixed. Acquired ventral hernias are frequently caused by trauma, recurrent stress on the abdominal wall's naturally weak spots, and prior surgery that resulted in an incisional hernia.<sup>5</sup> Pain, swelling, or fullness at the location of the hernia are the typical symptoms of an abdominal wall hernia, and however these might vary depending on the posture or Valsalva manoeuvre. The expansion may be erythematous or result in an asymmetry in some situations where a hernia has been choked or confined. Although a history and physical examination are usually sufficient to diagnose an abdominal hernia, excessive obesity, a significant risk factor, may restrict the examination. Because hernias can alter with activity or simply standing, it is crucial that the patient be evaluated in a variety of postures throughout the examination.<sup>6</sup> Patients who have significant procedures, such as mesh repair for abdominal hernias, are more likely to develop seroma. There is a greater chance of seroma development and related problems the larger the mesh repair area. In addition, age, the quantity of tissue removed, prior operations, heparin or oral anticoagulant usage, and a history of seroma are other risk factors.<sup>6</sup> 5.6% to 42% of instances of mesh-assisted abdominal hernia surgeries result in postoperative seroma.<sup>7</sup> The accumulation of fluid that happens following surgery is known as a seroma. There is debate over the aetiology of seroma development. It is thought to be the gathering of lymphatic fluid, inflammatory exudates, serum, and liquid fat behind a skin flap.<sup>8</sup>

Many parameters, such as the extent of dissection and the technique used to raise the skin flap—electrocautery, knife, or scissors—influence the quantity and duration of seroma production. Because the plasmin system has fibrinolytic action in the lymphatic and serum systems, it also aids in fluid collection. Fibrin complexes also have a role in lymph and blood leaking from the arteries.<sup>9</sup>

There are several methods for managing and preventing seroma.<sup>10</sup> After surgery, suction drains are utilized to track the quantity of seroma.<sup>11, 12</sup> Larger seromas are treated with needle aspiration, but most seromas go away on their own. Antibiotics are frequently needed for infected seromas, and occasionally surgery is required. Tranexamic acid can be used to stop the production of seromas.<sup>13</sup> This artificial antifibrinolytic drug is derived from the amino acid lysine. Despite the appropriate use of bleeding control techniques, surgical bleeding may occur when fibrinolysis surpasses coagulation. The purpose of tranexamic acid is to prevent fibrinolysis. It stops plasminogen from being activated to plasmin. It can be given intravenously or orally.<sup>14</sup> The present study was carried out to find the Role of tranexamic acid in prevention of seroma formation after ventral herioplasty.

## Materials and method

The present cross-sectional study was carried out at the department of General Surgery Department, Bolan medical college Quetta from November 2025 to April 2026 after taking permission from the research team of the hospital. Non-probability consecutive sampling approach was used for sample collection. A total of 100 individuals of both genders and different age group (ranged 21-61 years) diagnosed with ventral hernia repair were included while individuals who had bleeding disorders, strangled hernias cirrhosis and uncontrolled diabetes mellitus excluded. Anticoagulant medication had to be discontinued five days before to surgery by the participants. Clinical history and laboratory results were documented. Using pelvic and abdominal ultrasonography, the defect's size and content were assessed. All individuals were treated with the standard-only mesh. A vacuum drain was used to measure the seroma's volume. One gram of intravenous tranexamic acid was administered following skin closure, and 500 mg of oral tranexamic acid was administered for 12 hours on the 5th post-operative day. On daily basis the drain output was recorded. When the output was less than 30 milliliters per day, the drain was removed.

Descriptive statistics were used to show numerical and categorical data and were presented in frequencies and percentages. The results were categorized based on age and gender and presented in tables. To determine statistical significance the Chisquare test was employed. P-values less than .05 were regarded as statistically significant.

## Results

A total of 100 individuals participated in this study out of which 70(70%) were females and 30 (30%) were males. The mean age of the study participants was  $81.05 \pm 41.75$  years. Out of the total participants 12(12%) 21-32 years old, 26 (26%) were between the ages of 33 and 41, and 38 (38%) were between the ages of 42 and 61 years. Participants were categorized based on these factors in order to ascertain the effect of age and gender on seroma development as presented in table 1. In 84 individuals (84%) the seroma resolved within five days after surgery, but in 16 individuals (16%) it took longer than five day as presented in **table 2**.

**Table 1. Factors affecting the development of seromas**

| factor s            | stratificati on | Patient s no | Mean $\pm$ SD      | P valu e |
|---------------------|-----------------|--------------|--------------------|----------|
| <b>Gende r</b>      | Male            | 30           | $84 \pm 24.24$     | 0.728    |
|                     | Female          | 70           | $104 \pm 47.85$    |          |
| <b>Age in years</b> | 21-41           | 38           | $80.04 \pm 40.64$  | 0.188    |
|                     | 42-61           | 38           | $108.76 \pm 50.83$ |          |

**Table 2. The relationship between post-operative days and seroma reduction**

| N=100 | Post-operativ e days | Patient s numbe r | percentag e | Mean $\pm$ SD   |
|-------|----------------------|-------------------|-------------|-----------------|
|       | Above 5 days         | 84                | 84%         | $84 \pm 24.24$  |
|       | Less than 5 days     | 16                | 16%         | $130 \pm 43.87$ |

## Discussion

A hernia is an illness when the tissues of the abdominal region protrude from a weak area on the abdomen. It is mostly caused by the intestine or

omentum bulging due to an abdominal wall abnormality. Hernias often require surgery to be corrected, and they may develop between the hips and the chest.<sup>15</sup> There is a significant chance of seroma production after major surgical procedures like hernia repair. Risk factors include age, anticoagulant usage, the location of the dissected tissue, and previous history of surgery & seroma development.<sup>16</sup> Serum is the fluid that is collected, while seroma is the term used after surgery. It occur as a result of blood vessel and lymphatic injury leaking. These are frequently evacuated via suction drains. These drains can also be used to monitor the fluid collected in the closed cavity.<sup>17</sup> Following abdominal hernia repair, seroma develops in 5.6%–42% of patients.<sup>18</sup> Below the skin, there is swelling, and the fluid has a clear or yellow appearance. The fluid may turn purulent or blood-stained when infected.<sup>19</sup> A smaller volume of fluid can be handled conservatively, but a greater volume necessitates either needle aspiration or open drainage.<sup>20</sup> When mesh is used for hernia repair, fluid builds up. The larger the area mended with mesh, the higher the chance of seroma production. It is possible to prevent seroma production by using tranexamic acid.<sup>21</sup> Because of its anti-fibrinolytic properties, it stops and manages excessive bleeding in the early phases of recovery. Post-operative bleeding is reduced by 34% when tranexamic acid inhibits the activation of plasminogen to plasmin.<sup>22</sup> The present study was carried out to find the Role of tranexamic acid in prevention of seroma formation after ventral herioplasty. A total of 100 individuals participated in this study out of which 70% were females and 30% were male .our study findings are similar to the study conducted by Zubair, et al<sup>23</sup> in which females were predominant. Our study results are also parallel to the study of Ahmed, in which female were 75% and male were 25%.<sup>24</sup> We provided one gram of tranexamic acid to one hundred individuals who had been diagnosed with the repair of a ventral hernia. Participants were categorized based on these factors in order to ascertain the effect of age and gender on seroma development as presented in table 1. In 84 individuals (84%) the seroma resolved within five days after surgery, but in 16 individuals (16%) it took longer than five day. A similar study was conducted by Tarar et al. on 110 individuals with ventral hernia repair.<sup>25</sup> They reported that 81% seroma resolved within five days after surgery which and the results of their study are comparable to the present study. Hernia affects the abdominal wall. Non-lingual and non-hiatal abnormalities in the abdominal wall fascia are known as ventral abdominal hernias. Ten to fifteen percent of all surgical procedures carried out worldwide involve the standard surgical procedure

known as hernia repair.<sup>26</sup> Following a laparotomy, muscle-splitting incision, or laparoscopy, the likelihood of having a hernia is 10%, 5%, and 1%, respectively. After hernia repair, seromas are frequently seen, especially when there is extensive tissue disturbance and a broad area involved. It is a collection of serum, lymphatic fluid, liquefied fat, and inflammatory exudates; its etiology is unknown. The length of time and quantity of seroma are affected by a number of variables, such as the depth of dissection and the technique used to raise the skin flap (such as electrocautery or a knife). If left untreated, seromas become infected.<sup>27</sup> additionally, it raises the chance of infection. It is a great place for bacteria to grow and can lead to deadly side effects such wound dehiscence and septicemia. Seroma was a frequent post-hernia repair consequence in this study. Age and gender had no effect on seroma formation, according to other research assessing the risk factor for seroma formation. Tranexamic acid improves wound healing by successfully reducing postoperative serous fluid and seroma development.<sup>28</sup> Tranexamic acid reduced seroma, serous fluid, and post-operative soreness in 81% of patients, according to a research.<sup>29</sup> The results of our study demonstrated that it successfully lowers seroma formation. Post-operative drainage is decreased when 1g of tranexamic acid is taken on daily basis.<sup>23</sup> Another randomized, double-blind trial showed the same outcomes, showing that giving 1gram of tranexamic acid decreased post-operative drainage.<sup>24</sup> The results of our study showed that the mean duration of seroma in the majority of patients was ten days. Our study's strength is that tranexamic acid seems to be an independent factor in seroma reduction. There are several limitations of our study. Its study design is cross-sectional; a retrospective study design will allow results to be compared with those of the control group.

## Conclusion

The current study concluded that Tranexamic acid significantly lowers the development of seromas following surgery for ventral hernia repair.

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