

Role of tranexamic acid in prevention of seroma formation after ventral hernioplasty

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Abstract

Objective: To see the role of tranexamic acid in seroma formation after ventral hernioplasty.

Study design: Cross sectional study.

Place and duration of study: General surgery department of Hamdard University hospital (HUH), from April 1st 2016 to March 30th 2017.

Material and Methods: Patients were selected by non-purposive convenience sampling. 70-patients undergoing Mesh Hernioplasty for ventral hernias under general anesthesia are included and divided into two equal groups. Patients with BMI of 18-24.99 were selected. Hernias that require mesh of 15x15 cm and patient with ASA 1 and 2 are included. Age range is 18-60 years. Recurrent and incisional hernias are excluded. Injection Tranexamic acid 1G TDS for 48 hours. Drains were kept till the output is less than 30ml/day. Total output was measured and compared in two groups.

Results: In Group 1 (patients who received tranexamic acid post-operatively), out of 35 patients only 11-patients had total drain output of <150ml, 19-patients had total drain output between 150-300 ml and 5-patients had drain output of >300 ml. Total drain output of all patients was 7,000 ml with an average of 200ml/patient. In Group 2 (patients who didn't receive tranexamic acid), out of 35-patients none had drain output <150ml, 12 patients had drain output between 150-300ml and 23 had drain output >300ml. Total drain output of all patients was 11,200 ml with an average of 320ml/patient.

Conclusion: Our study showed decrease in post-operative seroma formation after intravenous administration of Tranexamic acid for 48-hours. It also reduces the total time of drain removal.

Keywords: Seroma, tranexamic acid, ventral hernia, drain output.

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Introduction:

Ventral hernias are one of the most common problems dealt by general surgeons all over the world. There are various techniques used in literature for ventral hernia repair, currently the most popular being the hernioplasty which can be done either by open or laparoscopic technique.¹ Different types of mesh have been used in hernioplasty among which Prolene mesh is most commonly used as it minimizes the chances of recurrence.²

Seroma formation is the most common post-operative complication of ventral wall hernia re-

pair. There are multiple un-avoidable factors that contribute in seroma formation like excessive use of cautery, dissection in the plane below the Scarpa's fascia and use of sclerosants etc.³ This seroma, if gets infected and doesn't find its way to get drained leads to complications like wound infection and wound dehiscence.⁴

Multiple techniques are used by surgeons to minimize the risk of seroma formation and to prevent patient from future complications. Tranexamic acid is a synthetic derivative of the amino acid lysine (4-aminoethyl cyclohexane carboxylic acid), that exerts its anti-fibrinolytic

Table 1: Distribution of patients according to gender

Group	Male	Percentage	Female	Percentage
A (35 patients)	10	28.5%	25	71.4%
B (35 patients)	12	34.5%	23	65.7%

Table 2: Comparison of Seroma (Drain output) in Two groups

Group	Drain output <150ml	Drain output 150-300ml	Drain output >300ml
A	31.4%	54.2%	14.2%
B	0%	34.2%	65.7%

effect through the reversible blockade of lysine binding sites on plasminogen molecules, thereby reducing the conversion of plasminogen to plasmin.⁵ Hence, it blocks the dissolution of hemostatic fibrin, which stabilizes fibrin structure and thus may decrease the formation of seroma at the site of dissection.⁶

Our study aims to establish the role of tranexamic acid in seroma formation after ventral hernioplasty. There is not much data available to support this hypothesis. However, studies showed the established role of tranexamic acid in hemostasis through its fibrinolytic property.

Materials and Methods:

This study was conducted at Hamdard University Hospital Karachi, from April 1st 2018 to March 30th 2019. 70-patients including of ventral hernia who underwent hernioplasty under general anesthesia. All patients with BMI of 18-24.99 were included in this study. Hernias that require mesh size of 15x15cm and with ASA 1 and 2 are included in this study. Age range is 18-60-years.

Patients were selected through above mentioned criteria and divided equally into two groups. Standard 15x15cm Prolene mesh is used after sublay repair in both groups. In group-1, patients received Tranexamic acid 1G TDS for 48 hours and in group-2, patients were not given Tranexamic acid. Vacuum drain was placed after hernioplasty in both groups and kept till the output is less than 30ml/day. Total output was measured and compared in two groups.

Results:

Total of 70-patients were included in this study, 35 in each group. Distribution of patients according to gender is shown in table-1. In Group-1 (patients who received tranexamic acid post-operatively), out of 35-patients only 11-patients had total drain output of <150ml, 19-patients had total drain output between 150-300ml and 5-patients had drain output of >300ml.

In group-2 (patients who didn't receive tranexamic acid), out of 35-patients, 12-patients had drain output between 150-300ml and 23 had drain output >300ml as shown in table-2.

Discussion:

Tranexamic acid (TXA) was discovered in 1962 by Utako Okamoto.⁷ It is a well-known drug used to treat or prevent excessive hemorrhage from major trauma, post-partum bleeding, surgery, tooth removal, nose bleeding, and heavy menstruation.⁶ It has also been included in the WHO list of essential medicines. TXA is an inexpensive and treatment would be considered highly cost effective in high, middle and low income countries. It can be taken either by mouth or injection into a vein. The suggested dose of Tranexamic acid is 1 g (1 ampoule of 10 ml or 2 ampoules of 5 ml) by slow intravenous injection (1 ml/minute) every 6 to 8 hours, equivalent to 15 mg/kg body weight.⁸ No dose adjustment is required in patient with hepatic impairment, making it safe medicine in patients with chronic liver disease.

There are several studies which shows the established role of tranexamic acid in controlling bleeding after orthopedics surgeries. Thus, reducing the need of transfusion post-operatively. In such cases, the TXA has been used to irrigate the surgical site, injected intra-articularly, or both.⁹ Eight high quality studies (Antinolfi¹² 2013, Charoencholvanich 2011, Gautam 2011, Good 2003, Ishida 2011, Roy 2012, Sa-Ngasongsong 2013, Sarzaeem 2014, Pachauri 2014) were reviewed to assess the impact of tranexamic acid administration on blood loss and transfusion rates post total knee arthroplasty.¹⁰ How-

ever, the doses and duration of tranexamic acid therapy varies in all these studies.

Poeran et al. recently explored these advantages in the context of TXA administration in major joint arthroplasty. The group showed that the use of TXA in patients undergoing total hip or knee arthroplasty was not only effective but also potentially safe. Among 872,416 patients from 510-hospitals in the United States the authors reported reduced odds for blood transfusion by more than 60%.¹¹

An additional approach to address safety issues with TXA focuses on attempts to reduce systemic levels of the drug by topical application at the surgical site. In this regard, Gomez-Barrena et al. published results of a clinical trial in *The Journal of Bone and Joint Surgery* regarding the use of topical TXA compared to an intravenous application in patients undergoing primary total knee arthroplasty.¹²

We did not find much data to support the hypothesis that Tranexamic acid reduces post-operative seroma formation after ventral hernioplasty. However, few studies show reduction in seroma formation after breast surgeries. Oertli D. et al. showed in a randomized double-blind trial that, in 160-women with breast cancer undergoing lumpectomy or mastectomy with axillary clearance, peri-operative and post-operative administration of tranexamic acid 1gm three times daily resulted in a significant reduction in the mean post-operative seroma drainage volume compared with patients given placebo (283 versus 432 ml, $P < 0.001$). The frequency of postoperative seroma formation was also decreased by tranexamic acid administration (27 versus 37%, $P = 0.2$).¹³

In another prospective randomized study by Gogna S¹⁴. and Goyal P., showed effect of tranexamic acid in seroma formation following modified radical mastectomy for cancer breast has shown that, in 50-women with breast cancer undergoing modified radical mastectomy with level-III axillary clearance, peri-operative

and post-operative administration of tranexamic acid 1g three times daily resulted in a significant reduction in the mean post-operative drainage volume compared with patient not receiving tranexamic acid (781.4 ± 248.64 vs. 1023 ± 196.3 ml; $p < 0.001$).¹⁴

In our study, we observed the promising results of Tranexamic acid administration in hernioplasty. Only 14.2% of patients who received TXA had seroma formation of more than 300ml as compare to 65.7% patients who did not receive it. Drain output was between 150-300ml in 54.2% in group-A and 34.2% in group-B. Less than 50ml of seroma formation is calculated in 31.4% and 0% in group A and B respectively.

Conclusion:

Tranexamic acid reduces post-operative seroma formation in patients with ventral hernia repair after mesh hernioplasty. It also reduces the total time of drain removal after surgery. Thus, it is concluded that Tranexamic acid in divided doses reduces overall cost and morbidity of the patient and help them in early return to usual life.

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Role and contribution of authors:

Dr Rabbia Zubair, conceived the idea and did the initial write up.

Dr Masoom Raza Mirza, critically review the article and made the final changes.

Dr Lubna Habib, critically review the article and made useful changes.

Dr Javeria Iftikhar, collected the data and references and helped in introduction writing.

Dr Batool Zehra, helped in collecting the data, references and helped in discussion writing.

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