

Effectiveness of Tranexamic Acid for Prevention of Postoperative Seroma Formation in Patients Undergoing Ventral Hernioplasty

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ABSTRACT

Objective: To assess the effectiveness of tranexamic acid for prevention of postoperative seroma formation in patients undergoing ventral hernioplasty.

Study Design: Cross-sectional study

Place and Duration of Study: Department of Surgery, Khairpur Medical College Khairpur Mir's from 1st January 2020 to 30th June 2020.

Methodology: Ninety patients registered for the comprehensive demographic age, sex and body mass index. The patients were 20 to 60 years of age. They were divided in two equal groups; Group A patients received tranexamic acid 1gm postoperatively while group B did not received tranexamic acid. Drain output at 1st and 5th postoperative day was measured. Duration of drain was recorded and compare between both groups.

Results: Group A had 13 (28.9%) males and 32 (71.1%) females while in group B 30 (66.7%) patients were females and 15 (32.3%) males. Mean body mass index of patients in group A was 22.84±5.47 kg/m² while in group B mean BMI was 23.48±3.15 kg/m². A significant short time of drainage was found in group A 5.36±1.24 days as compared to group B 7.96±1.84 days (p-value <0.05). At 1st postoperative day mean drain output in group A was 110.34±29.43 ml and in group B it was 130.48±45.27 ml. At 5th postoperative day drain output in group A was 58.38±30.42 ml and in group B it was 89.64±32.55 ml, a significant difference was found between both groups with p-value <0.05. In group A, 4 (8.89%) patients had seroma while in group B 7 (15.56%) patients had seroma, the difference was not statistically significant.

Conclusion: The use of tranexamic acid for prevention of postoperative seroma formation in patients undergoing ventral hernioplasty was effective with less interval of time for removal of drain.

Keywords: Drain output, Tranexamic acid, Ventral hernia, Seroma

INTRODUCTION

Abdominal hernia is characterized as the bulging in the compromised abdominal part of some or all the abdominal cavity contents, out of abdominal wall defects leading to hernias, often intestines or omentum. These hernia can happen between the thorn and hips anywhere in the abdomen. The common procedure of repair of hernia is operative practice.¹ There is an increased risk of seroma development in patients with major procedures, such as abdominal hernia mesh repair. Including age, tissue dissection number, the use of anticoagulants and prior surgical history and seroma development, are also other risk factors.² Seroma means a fluid build-up in the tissue that can arise in the nearby blood and lymphatic vessels after paraumbilical hernioplastic fluid called serum fluids. Cells typically exist in the fluid, which is generally clear. Seroma formation may be related to an increased risk of infection and surgical site disruption. After some procedures, surgical drain tubes are used to reduce the possibility of seroma formation after some surgeries. They allow fluid leakage volume to be controlled, and the drainage is removed when it becomes minimal. Seromas may grow shortly following surgery when drains are not used and after drain removal.³

Small seromas can always solve alone, but they can also calcify hard nodes without being handled. Larger seromas also require aspiration (fluid removal), normally done with a needle. Infected seromas could need antibiotic therapy and seroma may need operation on rare occasions.⁴ Surgeons use several strategies to minimise

the risk of seroma development and eliminate potential complications for patients. Tranexamic acid is a synthetic derivative of the amino acid lysine (4-aminoethyl cyclohexane carboxylic acid), that exerts its anti-fibrinolytic 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

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. If fibrinolysis surpasses coagulation, surgical bleeding can occur despite the proper use of bleeding control methods. Tranexamic acid is given to inhibit the process of fibrinolysis. It prevents plasminogen from being activated in plasmin. Its use can decrease postoperative bleeding by 34%.^{7,8} The rationale of our study was to find out the effectiveness of tranexamic acid in prevention of seroma after mesh repair.

MATERIALS AND METHODS

This cross-sectional/observational study was conducted at Department of Surgery, Khairpur Medical College Khairpur Mir's from 1st January 2020 to 30th June 2020. A total of 90 patients of both genders with ages 20 to 60 years undergoing ventral hernioplasty were enrolled. After taking written consent from all the patients comprehensive demographics including age, sex and BMI were recorded.

Patients with complicated hernia, patients with recurrence and those with no consent were excluded. Patients were divided equally into two equal groups; group A and group B. Prolene mesh is used in both groups after sublay repair. Group A patients received IV tranexamic acid 1gm postoperatively at skin closure and then 500mg 12 hourly till 5th postoperative day, while group B did not received tranexamic acid. After hernioplasty the vacuum drain in both groups was positioned and sustained until the production was less than 30 ml/day. Drain output at 1st and 5th postoperative day was measured. Duration of drain was recorded and compare between both groups. Data was analyzed by SPSS 24.0.

RESULTS

There were 13 (28.9%) males and 32 (71.1%) females in group A while in group B, 30 (66.7%) females and 15 (32.3%) were males. Mean body mass index of patients in group A was 22.84±3.47 kg/m² while in group B mean body mass were 23.48±3.15 kg/m² (Table 1). A significant short time of drainage was found in group A 5.36±1.24 days as compared to group B 7.96±1.84 days (p-value <0.05) (Table 2), n group A, 4 (8.89%) patients had seroma while in group B 7 (15.56%) patients had seroma, the difference was not statistically significant (Table 3).

Table 1: Baseline details of enrolled patients

Variable	Group A	Group B
Gender		
Male	13 (28.9%)	15 (32.3%)
Female	32 (71.1%)	30 (66.7%)
Body mass index (kg/m ²)	22.84±3.47	23.48±3.15

Table 2: Comparison of drain output and drain’s duration between both groups

Variable	Group A	Group B	P value
Mean Drain Duration (Days)	5.36±1.24	7.96±1.84	0.01
Drain output at 1 st PO day	110.34±29.43	130.48±45.27	0.0001
Drain output at 5 th PO day	58.38±30.42	89.64±32.55	0.0001

Table 3: Seroma formation between both groups

Seroma	Group A	Group B	P value
Yes	4 (8.89%)	7 (15.56%)	0.072
No	41 (91.11%)	38 (84.44%)	

DISCUSSION

Abdominal wall hernias are one of the most common problems with surgery, mainly due to any condition that increases intra-abdominal cavity pressure.⁷ In both of these patients, a transverse incision and a suction drain were submitted to hernioplasty and on-lay mesh repair in both categories. In our study, we found that there has been no significant association between gender and age for complications in both groups such as seroma, injury infection and post-operative drainage period, which is consistent with a Patel et al.⁹

Seromas are common and typically occur after various types of hernia repairs, especially those with large tissue disorders. The exact aetiology of the seroma formation remains controversial, though liquefied fat,

serum, inflammatory exudates and lymph fluid are known to be accumulated under the skins. The quantity and length of the development of seroma differ and are affected by several factors including dissection, skin flap lifting and electricity or the knife. Seromas which are not treated are usually contaminated.^{10,11} The dosage suggested is 1 g (1 ampoule 10 ml or 2 ampoule 5 ml), per 6 to 8 hours, with intravenous slow injection, equal to 15 mg/kg, of tranexamic acid. [6] Tranexamic acid administration also decreased the frequency of postoperative seroma formation (27% compared to 37%, P = 0.2).¹²

In our research, we found that patients received tranexamic acid had significantly shorter drainage duration 5.36±1.24 days as compared to group B 7.96±1.84 days (p-value <0.05). A study conducted by Albatanony et al¹³ reported that IV tranexamic acid with induction of anesthesia had shorter duration of drainage as compared to patients without tranexamic acid with p-value <0.05.

In present study, at 1st postoperative day mean drain output in group A was 110.34±29.43 ml and in group B it was 130.48±45.27 ml. At 5th postoperative day drain output in group A was 58.38±30.42 ml and in group B it was 89.64±32.55 ml, a significant difference was found between both groups with p-value <0.05. These results were comparable to many of previous studies in which tranexamic acid showed significant decrease in drain volume and effective for the prevention of seroma formation.^{14,15}

In our study we found that, in group A, 4 (8.89%) patients had seroma while in group B 7 (15.56%) patients had seroma, the difference was not statistically significant. A study conducted by Zubair et al¹⁶ regarding role of tranexamic acid in prevention of seroma formation and they reported that 14.9% patients had seroma who received tranexamic acid while among patients who didn’t receive tranexamic acid 65.7% patients had seroma.

A research by Ahmed et al¹⁷ found that 81% of seroma patients had subsided in the community of tranexamic acid within 5 days, and that it had taken more than 5 days, as it was in 19% of patients. The successful decrease in postoperative soakage, seroma and serous fluid formation was observed in anti-fibrinolytic drug tranexamic acid. It improves wound healing according to reports. Tranexamic acid has also been active in reducing seroma levels in our sample. A double-blind randomised study found that the total post-operative drainage volume and median hospital stay length of tranexamic acid 1g per day have also been substantially reduced.¹⁸

CONCLUSION

Tranexamic acid assisted in decreasing the amount of seroma development in ventral hernias operations postoperatively. This can avoid complications including wound infection and dehiscence.

REFERENCES

1. Ammar AA, Ismail T. Abdominal wall hernias in upper Egypt: A different spectrum. East Central Afr J Surg 2008;13:109-14.
2. Cho JE, Helm MC, Helm JH, Mier N, Kastenmeier AS, Gould JC, et al. Retrorectus placement of bio-absorbable mesh improves patient outcomes. Surg Endosc 2019;33:2629-34.

3. Vlasov AV, Kukosh MV. The problem of wound complications in abdominal wall endoprosthesis replacement in ventral hernias. *Sovremennye Tehnologii Med* 2013;5(2):116-22.
4. Purushotham G, Revanth K, Aishwarya M. Surgical management of umbilical and paraumbilical hernias. *Int Surg J* 2017;4(8):2507-11
5. Vijay BS, Bedi V, Mitra S, Das B. Role of tranexamic acid in reducing postoperative blood loss and transfusion requirement in patients undergoing hip and femoral surgeries. *Saudi J Anaesthesia* 2013;7(1):29.
6. Gadre A, Stoller JK. Tranexamic acid for hemoptysis: a review. *Clin Pulmonary Med* 2017;24(2):69-74.
7. Ponten JEH, Somers KYA, Nienhuijs SW. Pathogenesis of the epigastric hernia. *Hernia* 2012;16:627-33.
8. Nixon SJ. Abdominal wall hernia and umbilicus. In: Williams NS, Bulstrode CJK, O'Connell PR, editors, *Bailey & Love's Short practice of Surgery*. 26th ed. CRC Press: Taylor & Francis Group, 2013: 948-69.
9. Patel JN, Spanyer JM, Smith LS. Comparison of intravenous versus topical tranexamic acid in total knee arthroplasty: a prospective randomized study. *J Arthroplast.* 2014;29(8):1528-31
10. Yan-ping L, Wen-jin Y, Ting-ting Y. Risk factors for postoperative seromas in Chinese breast cancer patients. *Chinese Med J* 2011;124(9): 1300-4.
11. Seretis K, Goulis D, Demiri EC, Lykoudis EG. Prevention of seroma formation following abdominoplasty: a systematic review and meta-analysis. *Aesth Surg J* 2017;37:316-23.
12. Poeran J, Rasul R, Suzuki S, Danninger T, Mazumdar M, Opperer M, Boettner F, Mementsoudis SG. Tranexamic acid use and postoperative outcomes in patients undergoing total hip or knee arthroplasty in the United States: retrospective analysis of effectiveness and safety. *BMJ* 2014;349:g4829.
13. Albatanony A, Shahin M, Fayed A, El Shemi A. The effect of intravenous tranexamic acid on reduction of seroma after para-umbilical hernioplasty. *Int Surg J* 2019;6:2290-4.
14. Ausen K, Fossmark R, Spigset O. Randomized clinical trial of topical tranexamic acid after reduction mammoplasty. *Br J Surg* 2015;102(11):1348-53.
15. Mukherjee KA, Gunjan S, Tanusree K, Rulaniya SK, Saraf AK. Use of surgical site compression to prevent seroma formation following open inguinal hernioplasty with use of polypropylene mesh. *Int J Med Health Sci* 2017;6:24-6.
16. Zubair R, Mirza MR, Habib L, Iftikhar J, Zehra B. Role of tranexamic acid in prevention of seroma formation after ventral hernioplasty. *Pak J Surg* 2020; 36(2):126-129.
17. Ahmed H, Dawani S, Rasul S, Jaffer S. Seroma reduction and role of tranexamic acid in ventral hernia repair. *J Surg Pakistan* 2020;25 (2):89-92.
18. Eldesouky MS, Abo Ashour HS, Shahin MA. Effect of topical application of tranexamic acid on reduction of wound drainage and seroma formation after mastectomy. *Egypt J Surg* 2019;38:772-5.