International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

Effect of Tranexamic Acid on Blood Loss in Percutaneous Nephrolithotomy

Prakash J.V.S [1], Balaji A.R[2]

[1]Associate Professor, Department of Urology, Stanley medical College, Chennai, Tamil Nadu,India.

[2]Head and Professor, Department of Urology, Stanley medical College, Chennai, Tamil Nadu, India

Abstract: ***Introduction: Percutaneous nephrolithotomy (PCNL) is a minimally invasive method of treatment for large kidney stones. Bleeding is one of the serious complications associated with this type of surgical intervention. Objectives of the study: To evaluate the efficiency and safety of tranexamic acid in reducing blood loss and transfusion requirements in patients with kidney stones treated by percutaneous nephrolithotomy. Materials & methods: A total of 141 patients diagnosed with renal calculus who underwent percutaneous nephrolithotomy from August 2013 – July 2016 were included. The staghorn to non-staghorn calculi ratio was 1:2.Most procedures were completed through a single percutaneous tract. The patients were divided in two groups: 69 (group 1) received one hour prior to surgery 1 g Exacyl (tranexamic acid) in 250 ml saline solution 0.9% with slow infusion (1 hour); infusion with the same dose was repeated 12 hours post surgery, while 72 patients (group 2) did not receive tranexamic acid. The clinical data were compared. Results: The mean hemoglobin drop in the tranexamic acid group was significantly lower than that of the control group (1.1 g vs 2.4 g). The transfusion rate was also higher in the control group (6 patients vs. 1 patient). The postoperative complications were represented by postoperative pain (25.5%), fever (12.7)%, hematuria (19.1%), urinary sepsis (only one case – 2.1%). Conclusions: Tranexamic acid in percutaneous nephrolithotomy is safe, affordable and is associated with lesser blood loss and a lower transfusion rate.***

Keywords: Percutaneous nephrolithotomy, PCNL, tranexamic acid

1. Introduction

Percutaneous nephrolithotomy (PCNL) is a minimally invasive method of treatment used for kidney stones >2 cm. It remains the standard procedure for large renal calculi. Although this procedure has much lesser complications than open surgery, the complications following this procedure can be serious. Morbidity and complications following PCNL are caused usually by fever (10.5%) and bleeding (7.8%).Tranexamic acid is a synthetic derivative of lysine that exerts its antifibrinolytic effect through blockade of lysine binding sites on plasminoge. Experience with tranexamic acid in reducing haemorrhagic complications of percutaneous nephrolithotomy is limited.

2. Aims and Objectives

To evaluate the efficacy and safety of tranexamic acid in reducing blood loss and transfusion requirements in patients with renal calculi treated with percutaneous nephrolithotomy.

3. Methodology

Type of study : Prospective study
Duration of study : August 2013 to July 2016
Sample size : 141
Setting : Department of Urology and renal transplantation, Stanley medical college, Chennai

Exclusion criteria
Children, coagulopathies, abnormal kidneys with calculi, neurological disorders, patient refusal.

The 141 patients were divided in two groups: 69 (group 1) received one hour before surgery 1 g tranexamic acid) in 250 ml normal saline solution 0.9% with slow infusion (1 hour); infusion with the same dose was given 12 hours post-surgery, while 72 patients (group 2) did not receive tranexamic acid. All PCNLs were done in prone position by surgeons experienced in endourology and percutaneous renal surgeries. The puncture was made using a combination of Bulls eye and triangulation method under fluoroscopic guidance.Tract was dilated serially upto 30 Fr. Lithotripsy was performed using ballistic fragmentation. Double J stenting was done at the end of surgery.The clinical data of the patients were compared.

All the patients were worked up with a contrast computed tomography -Urogram. Those with positive urine cultures received appropriate antibiotic therapy. All patients were premedicated with Midazolam.1 hour prior to surgery 23 patients received 1 g tranexamic acid in 250 ml normal saline solution 0.9% with slow infusion (1 hour); infusion with the same dose was repeated 12 hours post-surgery. Postoperative evaluation included a complete hemogram with Hemoglobin levels on the day of surgery and on the 2nd day included plain X ray / USG.

4. Results

The mean age of the patients was 52 years, the mean operative time was 73 minutes. The overall stone free rate was 89%. The postoperative complications were postoperative pain (50%), fever (30)%, hematuria (26%), urinary sepsis (6 cases - 2.4%). The mean hemoglobin drop in the tranexamic acid group was significantly less compared to that of the control group (1.1 g vs 2.4 g). The transfusion rate was also higher in the control group (18 patients vs. 3 patients).

5. Discussion

Tranexamic acid was successfully used in many surgical procedures: cardiovascular, general surgery, spine surgery[1],[2].The use of tranexamic acid has limited and usually minor complications[3]. A meta-analysis conducted by Ker and al. concluded that tranexamic acid reduces the need for blood transfusion in surgery, although thromboembolic events and mortality remains uncertain[4]. In urological surgery, tranexamic acid was used before in prostate surgery (transurethral resection of the prostate or radical prostatectomy) with good results. Crescenti and al. reported an absolute reduction in transfusion rate 21% for radical retropubic prostatectomy, and a relative risk of need for transfusions for patients treated with tranexamic acid of only 0.62 with no statistical differences in thromboembolism between the two groups[5]. The experience with tranexamic acid in preventing blood loss during percutaneous nephrolithotomy is less. Kumar et al reported encouraging results in a prospective randomized controlled study - the mean hemoglobin drop, transfusion requirements and operative time were significantly lower in patients who received tranexamic acid [6].

6. Conclusions

The use of Tranexamic acid in percutaneous nephrolithotomy is safe and is associated with reduced blood loss and a lower transfusion rate. The authors recommend using tranexamic acid in PCNL when the risk of associated bleeding is high.

References

[1] Fergusson DA, Hébert PC, Mazer CD, Fremes S, MacAdams C, Murkin JM, et al. A comparison of aprotinin and lysine analogues in high-risk cardiac surgery. N Engl J Med 2008;358:2319-31
[2] Christopher Kim, Sam Si-Hyeong Park, and J Roderick Davey. Tranexamic acid for the prevention and management of orthopaedic surgical hemorrhage: current evidence. J Blood Med. 2015; 6: 239–244
[3] Henry DA1, Carless PA, Moxey AJ, O'Connell D, Stokes BJ, Fergusson DA, Ker K. Anti-fi brinolytic use for minimising perioperative allogeneic blood transfusion. Cochrane Database Syst Rev. 2011 Mar 16;(3)
[4] Ker K., Edwards P, Perel P, Shakur H, Roberts I. Effect of tranexamic acid on surgical bleeding: systematic review and cumulative meta-analysis. BMJ. 2012 May 17;344
[5] Crescenti A1, Borghi G, Bignami E, Bertarelli G, Landoni G, Casiraghi GM, Briganti A, Montorsi F, Rigatti P, Zangrillo A.; Intraoperative use of tranexamic acid to reduce transfusion rate in patients undergoing radical retropubic prostatectomy: double blind, randomised, placebo controlled trial. BMJ. 2011 Oct 19
[6] Kumar S., Randhawa MS, Ganesamoni R, Singh SK.Tranexamic acid reduces blood loss during percutaneous nephrolithotomy: a prospective randomized controlled study.J Urol. 2013 May; 189(5):1757-61. Epub 2012 Oct 30.).