Original Article

The efficacy of fibrin glue injection in the prostatic fossa on decreasing postoperative bleeding following transurethral resection of prostate

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Abstract

Background: To evaluate the efficacy of fibrin glue injection in the prostatic fossa at the end of transurethral resection of prostate (TURP), in decreasing postoperative bleeding in patient with benign prostatic hyperplasia (BPH).

Materials and Methods: In this prospective randomized clinical trial, sixty patients with BPH, who were a candidate for TURP, were randomly divided into two equal groups. In the intervention group, 10cc of fibrin glue was injected in the prostatic fossa at the end of the surgery; through a 5 Fr feeding tube attached to Foley catheter and its tip was proximal to the balloon of catheter. The other thirty patients created the control group. Hemoglobin (Hb) level and lower urinary tract symptoms (LUTS) score were recorded before and 6, 24, 48 h, and 5 days after TURP.

Results: The mean age of the patients and prostate volumes were comparable between the groups. The mean Hb level before and 6 h after TURP were not different between the two groups, however, 24 and 48 h and 5 days after TURP, there was a significant difference as well as a higher decrease in the mean Hb level of the control group ($P = 0.023$). The mean LUTS score was not statistically different between the two groups.

Conclusion: Fibrin glue injection in the prostatic after TURP reduces postoperative bleeding without any effect on LUTS score in patients with BPH.

Key Words: Benign prostatic hyperplasia, fibrin glue, postoperative bleeding, prostate, transurethral resection

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is a common condition, affecting a large percentage of aging men every year and if left untreated, it can lead to significant complications such as refractory urinary tract infection (UTI), bladder stone, recurrent bleeding, urinary incontinence, impaired renal function, and even death.[1] The first-line treatment is medical therapy, and when ineffective, surgery is considered, with transurethral resection of prostate (TURP) being the gold standard.

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The criteria for performing TURP surgery are now more stringent than before. In general, TURP surgery is reserved for patients with symptomatic BPH who have acute, recurrent, or chronic urinary retention; in whom medical management and less-invasive prostatic surgical procedures failed; who have prostates of an unusual size or shape (e.g., a markedly enlarged median lobe, significant intravesical prostatic encroachment); who have azotemia or renal insufficiency due to prostatic obstruction; or who have the most severe symptoms of prostatism.

However, this operation has a number of complications; the most important being bleeding that may warrant continuous irrigation, blood transfusion, and/or clot evacuation. Excessive bleeding may lead to cardiopulmonary events and acute myocardial infarction.[2]

Any action that reduces the amount of bleeding after surgery could be of value. For this purpose, a number of techniques have been suggested such as oral tranexamic acid injection of thrombin,[3,4] phenol,[5] and epinephrine[6] in prostatic fossa with no documented efficacy.

Medical treatment with fibrinolysis inhibitors such as aminocaproic acid has been beneficial, but the effect does not appear immediately; therefore, other methods have been introduced such as fibrin glue as an alternative in open prostatectomy by Gasser and Mossing with a significant reduction in postoperative blood loss. Fibrin glue has been used in gastrointestinal, and liver surgery or partial nephrectomy and successfully has decreased bleeding after surgery. Its usage in prostate surgery has been reported and is associated with decreased bleeding.[7-13]

In the current study, we aimed to evaluate the effect of fibrin glue injection in the prostatic fossa on postoperative bleeding and lower urinary tract symptoms (LUTS) score in TURP.

MATERIALS AND METHODS

In this prospective randomized clinical trial, sixty men with BPH, who were a candidate for TURP were divided into two equal groups with simple randomization method. The Ethics Committee of the institution approved the protocol and written informed consent was signed by all the patients.

Inclusion criteria were age between 50 and 70 years, with normal coagulation state and stable hemodynamic, prostatic specific antigen <4 and prostatic volume between 30 and 50cc according to perspective abdominal ultrasonography. Since this was our first experience with autologous fibrin glue, we excluded patients with larger prostate volume, since they have higher risk of postoperative bleeding. Exclusion criteria were history of anticoagulative or antiplatelet therapy, surgery on bladder and urethra, gross hematuria before surgery, preoperative anemia, needing transfusion, and history of renal and hepatic diseases and pathologically-proven prostate cancer.

In the intervention group, after attaching a 5 Fr feeding tube to a 3-way Foley catheter by chromic suture and insertion of the Foley at the end of operation, 10 mL of autologous fibrin glue, produced by Zist Partak Institute, Isfahan, Iran from 20cc of the patient's own blood in form of two component (concentrated fibrinogen and thrombin) by advanced centrifugal technique, was injected in prostatic fossa though attached feeding tube [Figure 1].

The position of the catheter tip and quality of injection were checked under fluoroscopy after injection of radiocontrast to proof the proper injection. Traction was applied for 10 min on the Foley catheter after injection. Finally, the feeding tube had extracted and Foley catheter remained [Figure 2].

Hemoglobin (Hb) level and LUTS score were recorded before and at 6, 24, and 48 h and 5 days after TURP. If Hb level <10 mg/dL was recorded, blood transfusion was considered.

Patients were discharged as soon as the severity of hematuria decreased to the level that eliminated the concern about cloth formation and retention, usually within 48 h after surgery, with administration of ciprofloxacin 500 mg twice daily until the time of catheter removal that took place after resolution of gross hematuria, usually between 3 and 7 days after surgery.

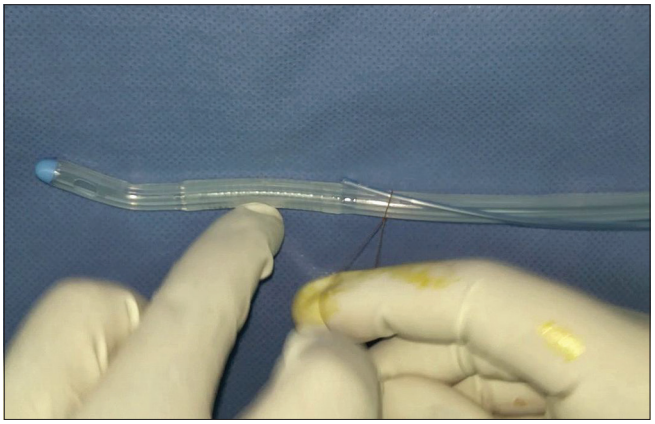

Figure 1: Tip of feeding proximal to balloon. Attaching a 5 Fr feeding tube to a 3-way Foley catheter by chromic suture

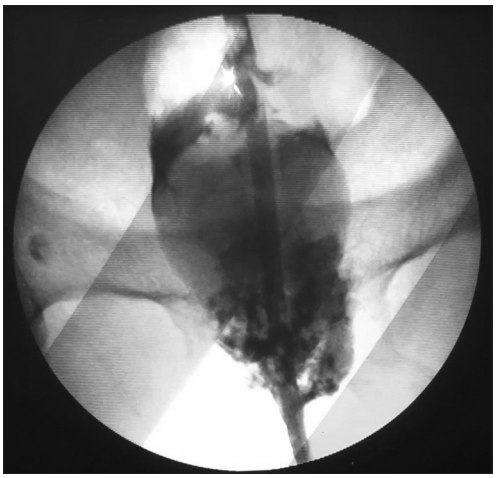

Figure 2: The position of the catheter tip and quality of injection were checked under fluoroscopy after injection of radiocontrast

All the operations were done by a single surgeon (MHK). Intra- and post-operative complications were recorded in questionnaires for statistical analysis using ANOVA test.

RESULTS

The mean age was 61.25 ± 8.36 and 62.7 ± 8.40 years in patients with and without fibrin glue injection, respectively (P = 0.59).

The mean prostate volume was 40.75 ± 5.73 and 45.95 ± 6.93 mL in intervention and control groups, respectively without significant difference (P = 0.92).

The mean Hb level before and 6 h after TURP were not different between the two groups, however, 24 and 48 h and 5 days after TURP, there was a significant difference, and the control group had a higher decrease in the mean Hb level (ANOVA; P = 0.023) [Table 1].

The mean LUTS score was not statistically different between the two groups before and until 48 h after TURP. It became significantly lower in the intervention group after 5 days. However, analysis of variances with repeated observations showed no statistically significant difference between the two groups (P = 0.21) [Figure 3].

No intra- and/or post-operative complications including TUR syndrome, clot retention, excessive bleeding mandating blood transfusion and UTI were observed in either group.

DISCUSSION

Obstructive BPH is the most frequent genitourinary pathology in the adult male population. Its prevalence

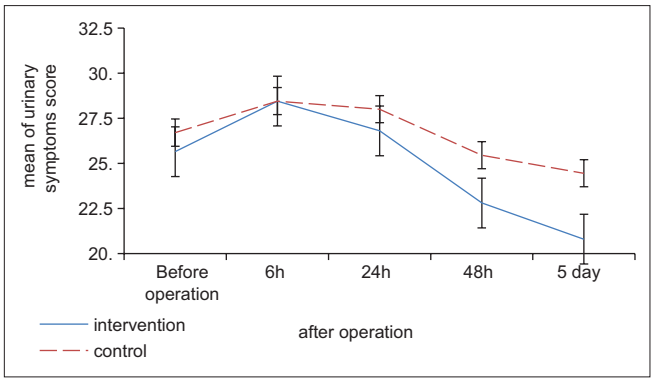

Figure 3: Mean of lower urinary tract symptoms scores in both groups before and 5 days after in both groups

Table 1: Mean and standard deviation of hemoglobin (mg/dL) before and 5 days after transurethral resection of prostate in both groups

Groups time	Intervention	Control	*P*
Before operation	14.77±1.07	14.75±0.88	0.94
6 h after operation	14.35±1.15	14.04±0.89	0.35
24 h after operation	14.11±1.09	13.37±1	0.032
48 h after operation	13.84±1.19	12.78±0.96	0.003
5 days after operation	13.5±1	12.08±0.8	<0.001

increases with age, affecting 50% of 50-year-old men and approximately 80% of men reaching 80 years of age.[10]

TURP continues to be the gold standard surgical procedure for BPH.[11] Fibrin glue is composed of concentrated fibrinogen in combination with thrombin for hemostasis and tissue adhesion that when applied to wound surface, helps to stop bleeding. In liquid form, as in our study, fibrin glue is generally sprayed directly into prostate fossa that is checked with flouroscopic study and has lower Hb decrease and bleeding without significant effect on LUTS score or adverse effect.

Many trials have shown that fibrin glue can reduce surgical blood loss and the need for blood transfusion in prostate surgery.[3,12,13] In our study, none of the patients needed blood transfusion, and the prostate size had no relationship with bleeding in our thirty patients in the intervention group, probably because we excluded patients with prostates larger than 50 mL. Hence, we believe more studies are needed with larger sample sizes and patients with larger prostates to see whether fibrin glue application can reduce the need for blood transfusion, which is a more important than the decrease in blood Hb level alone.

Moreover, we observed that fibrin glue instillation has no effect on storage symptoms after the operation, as

measured by LUTS score that has not been evaluated in previous studies.

We took 20cc of radial venous blood from patients in the intervention group, the day before surgery and sent it to a specialized institute and 10cc of fibrin glue was prepared and sent to our hospital the morning of operation day. Since we used autologous fibrin glue from own patient's blood, it was expectable that no reaction and blood transmitted infection be observed in the intervention group but in the other studies, fibrin glue has produced in allogenic form not from own patient's blood that allergic reactions and blood transmitted infection may occur.

Many studies have carried out by different specialists to determine fibrin glue usefulness during and after prostatic surgery in relation to bloodless that the prostate volume and method of randomization and effect on LUTS score of patients have not recorded definitively. Results have varied, but the majority of studies have shown blood loss reduction. In the study by Luke *et al*., fibrin glue (Berlisept) injection in prostatic fossa at the end of TURP decreased bleeding in 15 patients ($P < 0.01$).[9] In other two studies, fibrin glue was injected in prostatic fossa after suprapubic simple prostatectomy, although details of data were unavailable, one comparison study between these three studies has shown significant lesser blood loss with effect size of −70.25 ($P = 0.038$)[12,13] but in our study method of randomization and prostate volume and LUTS that impair the current results had evaluated that lessen the bias, so it is an innovation in this prostate surgery study.

One limitation of our study was its relatively small sample size. The other is that the study group was highly selected especially about prostate size and need to transfusion. Application of fibrin glue in patients with bleeding tendency on larger prostates may yield more significant results in terms of bleeding reduction. The effect on nursing is an important thing that in our study has not been evaluated too. Studies in different groups of patients are needed to better evaluate the efficacy of fibrin glue in patients undergoing TURP and need to blood transfusion due to bleeding and improving nursing care.

CONCLUSION

Instillation of fibrin glue in prostatic fossa after TURP in a patient with BPH can reduce postoperative blood loss without any effect on LUTS score.

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Conflicts of interest
There are no conflicts of interest.

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