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Research Article

Tissue Sealant-is it Necessary After Percutaneous Nephrolithotomy (PNL) or Not?

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Abstract: Purpose: to evaluate the safety and the advantages of haemotatic sealant in patients post tubeless PNL compared with that patient left without. Between January 2007 and April 2009, 100 patients with kidney stones were treated by tubeless PNL, they were divided in two groups, first group consisted of 51 patients in which the tract of PNL was filled with tissue sealant at the end of the procedure while the second group consisted of 49 patients, no tissue sealant was left. The mean age was 39.52 and 37.93 respectively while stone size was 1.5-6cm (mean 3.5) and 15-7cm (3.6) respectively. PNL was done in prone position in both groups. Operative time was comparable in both group, tissue sealant group was 15-90 minutes (mean 43.33) while no tissue sealant groups was 20-80 minutes mean (41.42) with no significant difference as p value was 0.686 and HB drop post operatively was from 0.3-4 gms mean (1.2) and .03-5 gms (mean 1.7) respectively without significant differences as p value was 0.455. Also hospital stay and complications were comparable. Tissue sealant is safe to be used post PNL but no advantages over if the tract is left without tissue sealant mainly from the points of hospital stay, Hb drop or urine leakage.
Keywords: Tissue Sealant, PNL, Tubeless.

INTRODUCTION

Urolithiasis is one of the most common diseases affecting the urinary tract and considered the leading cause of chronic renal failure in Yemen [1].

The access to the kidney was through open surgery till Goodwin and associates on 1955 [2] who reported the first experience with therapeutic percutaneous nephrostomies in 16 patients. Stone removal through a percutaneous nephrostorny tract positioned for this specific purpose was done by Fernstorm and Johansson [3]. Nowadays, percutaneous nephrolithotorny (PCNL) is a well known and established technique for the renal and upper ureter stones even staghorn [4]. The placement of percutaneous nephrostomy (PCN) in fact, at the end of the procedure is mandatory in the standard technique. The main function of PCN is to divert and drain urine, allow the renal puncture to heal and allow an access to the pelvicalyceal system if second look is needed [5]. First trial to omit PCN placement was face by significant complications which led urologist more adherent to this policy [6]. Since 1990, the policy of PCN has been challenged by many authors in an attempt to minimize PCN related morbidity and cost and advocate tubeless PCNL [6,7, 8]. Some workers advocate sealing of the tract with different types of tissue sealant aiming at minimizing bleeding and extravasations [9-11]. The most recent studies support, the use of hemostatic agents, first described in [16]. Fibrin glue was used to seal the nephrostomy tract following PCNL [12]. Commercial fibrin sealant has been widely used in Europe since 1970's but in United State it's used is limited till its approval by FDA in 1998. The aim of our study is to evaluate the safety and the advantages of haemostatic sealant used in patients post tubeless PNL compared with that patients left without use of those agents.

MATERIALS AND METHOD

Between January 2007 and April 2009, 100 patients with kidney stones were treated by tubeless PNL in our center. They were randomized prospectively, and divided into two groups; first group consisted of 51 patients with tissue sealant applied to the tract at the end of the procedure while 2nd group consisted of 49 patients without tissue sealant. Demographic data and stone characteristics are listed in (Table 1). The patients in both groups were evaluated by urine analysis, culture and sensitivity when indicated CBC, RFT, KUB, and IVU. The stone burden was assessed by measuring the longest diameter of all stone in the K.U.B film. The stone site in the pelvicalyceal system and degree of hydronephrosis were taken (Table 2, 3).

Both groups were treated by PNL in prone position in the same way; ureteric catheter insertion, Puncture, tract dilatation stone disintegration (lithoclass) and removal with reterograde pyelography to the end of the

procedure after the sheath being withdrawn to the periphery of the calyx to exclude any injury or extravasation out side the collecting system.

In the first group, we put tissue sealant through the seath and pushed it by nephroscope to the renal parnchyma of the kidney under fluoroscopic control. We used surgicel in 23 patients, Gelfoam in 26 and spongstan in two. The sheath was removed in both groups without leaving a PCN tube and just superficial skin suture for approximation for tissue sealant group but with deep skin suture for non-tissue sealant group at the tract site, and both groups left with only no.6 externalized ureteric catheter with foley catheter.

In both groups, the patients received intravenous antibiotic and observed in the recovery room for two hours for vital signs and any significant bleeding from the puncture site or urethral catheter then transferred to the ward. On the next day, we evaluate the patients by measuring Hb control, KUB and Abdominal ultrasound to check the decrease in HE, residual stone and haematoma or urine collection around the kidney and if the patients is stable and urine is clear, we removed the ureteric and foley catheter. And if not, we keep the patient for further observation. Fig. 1 and 2 are examples of some.

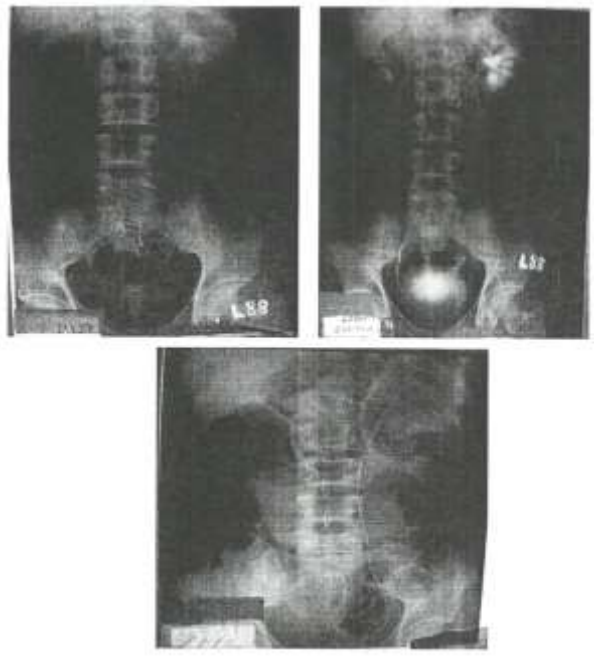

Fig. 1: Urograrn for 40 year old man, A-KUB film show left kidney stone about 4cm. ,B-IVP after 40 mm with moderate Hydronephrosis, C-control KUB 24 hours post tubeless PNL with tissue sealant; show no residual stone and ureteric Catheter still in place

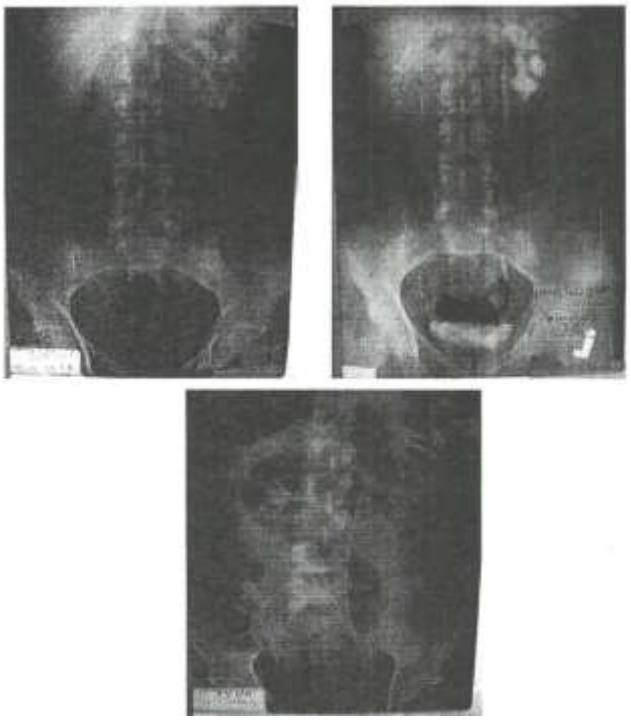

Fig. 2: Urogram for 32 years old man. A-KUB film with left multiple kidney stones, B-IVU after 50 minutes with moderate Hydronephrosis, C-Control KUB, 24 hours post tubeless PNL with tissue sealant without residual stone, and ureteric catheter still not removed.

RESULTS

PNL was done in both groups in prone position and fluoroscopy control. The punctures were through the lower calyx in 92 patients, through the middle and lower calyx in 4 patients, and through the lower and upper calyx in 4 patients. The total punctures in both were 108, and double in 8 cases. Operative time, Hb drop, blood transfusion, hospital stay and intra and post operative complications were comparable for both groups with no significant difference if P value is more than 0.05 (Table 4).

Intra operative complications in the form of bleeding & extravasation were managed by pushing the Amplatz sheath proxirnaly to the collecting system blood transfusion and after completion of the procedure by insertion of the tissue sealant in the first group and deep o silk stitch in the second group. Extravasation was minimal and ignored. Post operative complications occurred in 6 patients in the form of small prerenal haematoma (2-5cm) discovered by routine ultrasound done on the first post operative day in 5 patients table 5 managed conservatively and one patients from the 2nd group developed persistant haernaturia with increase creatinine, which improved gradually and creatinine back to normal on the third day by I.V fluid, tranxamic acid, blood transfusion and may be related to some hypotention occurred during the procedures.

DISCUSSION

In our study, we compared the efficiency of tissue sealent post tubeless PNL and without tissue sealant in the treatment of patients with kidney stones larger than 1.5cm in longest diameter and up to 7cm. The tissue sealant was surgicel, gelfoam, spongstan. We observed that there is no significant difference between the two groups regarding to operative time, Hb, drop post operatively and hospital stay as the P value was 0.686, 0.455 and 0.851 respectively.

As regard the complications, like extrvasation, bleeding, blood transfusion and prerenal haematorna they were also comparable and accepted. Both groups were matched from the points of patient's age, gender, stones site, size and degree of hydronephrosis as the Pvalue was greater than 0.05 (Table 1).

So our study is going with Hamendra N. Shah and colleagues [13] who studied 63 patients undergoing tubeless PNL which randomised to receive fibrin sealent in 32 patients and without sealant in the rest and they found no significant different in haematocrit drop or blood transfusion requirements in both groups. Shah et al [11] also in their study of 17 patients with injection of 2 ml of Tisseel Vapour into the precutaneous tracts at the end of procedure compared to control groups of 25 patients who underwent tubeless PCNL without use of tissue sealant and they found no difference in the meandrop in HB & blood transfusion or complications on both groups [14]. Also others after many studies came to the conclusion that sealing nephrostorny tract with surgical after totally tubleless PNL did not decrease the bleeding or extravasation fornr the tract [15, 16].

Table 1: Demographic data of patients and stone characteristics

		Tubeless PNL with tissue sealant	Tubeless PNL without tissue sealant	t test	P value
Gender	Female	42	29	0.33	0.86
	Male	9	20		
Age	Maximum	15	20	0.324	0.746
	Minimum	60	68		
	Mean	39.52	37.98		
Renal unit	Right	28	27		
	Left	23	22s'		
Total		51	49		
Stone size	Minimum	1.5	1.5	0.78 1	0.436
	Maximum	6	7		
	Average	3.5	36		

Table 2: Stone site

	First group	Second group
Pelvis	24	27
Pelvis + Lower calyx	18	11
Pelvis + upper+ lower calyx	2	2
Pelvis+ mid + lower calyx	2	3
Pelvis + all calyx	2	1
Pelvis + upper calyx	1	1
Pelvis + mid calyx	1	1
Middle calyx	1	1
Mid calyx + L. calyx	0	1
Lower calyx	0	1

Table 3: Degree of Hydronephrosis by U/S and I.V.P

Degree of hydronephrosis	Tubeless PNL with tissue sealant		Tubeless PNL without tissue sealant	
NO. Hydronephrosis	5	9.8%	4	8.16
Mild. Hydronephrosis	21	41.2% :	21	42.9 %
Moderate. Hydronephrosis	21	41.2%	20	40.8 %
Severe. Hydronephrosis	4	7.8%	4	8.16%
Pearson chi-square	0.00016			
P value	0.997			

Table 4: Intra- and post-operative data

Data		First group	Second group	p.value	T.test
Operative time (mm)	Maximum	90	80	0.686	0.405
	Minimum	50	20		
	Average	43.33	41.42		
Hb-drop (gm)	Maximum	4	5	0.455	0.750
	Minimum	0.3	0.3		
	Average	1.2	1.7		
Hospital Stay (hours)	Maximum	72	96	0.85	0.188
	Minimum	12	18		
	Average	39.56	38.81		

Table 5: Extravasations and bleeding during operation

	First group		**Second group**	
Bleeding	3	5.88%	2	4.08%
Blood transfusion	3	7.84%	2	2.04%
Extravasations	1	7.84%	1	4.08%

CONCLUSION

Tissue sealant are safe if used to seal the tract post PNL but without advantages over if the tract is left without tissue sealant mainly from the points of Hb drop, hospital stay or urine leakage.

REFERENCES

1. Raja'a Y, Al-Sofoi Y, Al-B, Adani T; Chronic Renal Failure in adult Yemeni patients: Risk factors. J of Arab board of medical specialization, 2003; 5(2): 40-41.
2. Goodwin WE, Casey WC, Woolf W; Percutaneous trocar (needle) nephrostomy in hydronephrosis. J Am Med Assoc., 1995; 157(11): 891-894.
3. Fernstorm I, Johansson B; Percutaneous pyelolithotomy. A new extraction technique.; Scand J Urol Nephrol., 1976; 10(3) 257-259.
4. Praninger GM, Assirnos DG, Lingeman JE, Nakada SY, Pearle MS; Wolf JS Jr.; AUA guideline on management of staghorn calculi: diagnosis and treatment recommendation. J Urol., 2005; 173: 1991- 2000.
5. Wilfield HN, Weyman P, Clayman RV; Percutaneous nephrolithotomy: complications of premature nephrostomy tube removal, J Urol., 1886; 136(1): 77-79.
6. Bellman GC, Davidoff R, Candela J, Gerspach J, Kurtz S, Stout L; Tubeless percutaneous nephrolithotomy: further evalutation of the technique. Endourol., 1997; 13: 177-180.
7. Goh M, Wolf JS Jr; Almost totally tubeless percutaneous nephrolithotorny: further evaluation of the technique. J Endurol., 1999; 13: 177-180.
8. Lojanapiwat B, Soothornphan S, Wudhikran S; Tubeless perctuaneous nephrolithotomy in selected patients. J Endourol., 2001; 15(7): 711-718.
9. Noller MW, Baughman SM, Morey AF, Augue BK; Fibrin sealent enables tubeless stone surgery. J Urol., 1994; 172(1): 166-169.
10. Lee DI, Uribe C, Eichel L, Khons S, Basillo j, Park HK *et al.*; Sealing percutaneous nephrolithotomy tracts 7 with gelatin matrix haemostatic sealent: metal clinical use. J Urol., 2004; 171 (2 Pt 1): 575-578.
11. Shah HN, Hedge S, Shah IN, Mohile PD, Yuvaraja TB, Bansal MB; Aprospective, randomized trial evaluating the safety and efficacy of fibrin sealent in tubeless percutaneous nephrolithotomy. J Urol., 2006; 176: 2488- 2492.
12. Aron M, Goel R, Kesiarwani PK, Gupta NP; Haernostasis in tubeless PNL: Point of technique, Urol Tnt., 2004; 7 3(3): 244-247.
13. Shah HN, Hegde S, Shah JN, Mohile PD, Yuvaraja TB, Manish B Bansa; A prospective, raundomised trial evaluating the safety and efficacy of fibrin sealant in tubeless percutaneous nephrolithotorny. J Endourol., 2006; 20 (3):194-198.
14. Shah RN, Kausik V, Hedge S, Shah JN, Bansal MB; Initial experience with hemostatic fibrin glue as adjuvant during tubeless percutaneous nephrolithotomy. J Endourol., 2006; 20(3): 194-198.
15. Agharnir SM, Khazaeli MH, Meisami A; Use of surgical for sealint neophrostomy percutanoeus nephrolithotomy. J Endourol., 2006; 20(5): 293-295.
16. Mikhail AA, Kaptein JS, Bellman GC; Use of fibrin glue in PNL. Urology, 2003; 61(5): 910-914.