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 nephrostomy in 16 patients. Stone removal through a percutaneous nephrostomy tract positioned for this specific purpose was done by Fernstorm and Johansson [3]. Nowadays, percutaneous nephrolithotomy (PCNL) is a well known and established technique for the renal and upper ureter stones even staghorn [4]. The placement of percutaneous nephrostomy (PCNL) 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 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 0.455. 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.
procedure after the sheath being withdrawn to the periphery of the calyx to exclude any injury or extravasation outside the collecting system.

In the first group, we put tissue sealant through the sheath and pushed it by nephroscope to the renal parenchyma 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.

**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 proximally 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 haematuria with increase creatinine, which improved gradually and creatinine back to normal on the third day by I.V fluid, traxamic acid, blood transfusion and may be related to some hypotention occurred during the procedures.
DISCUSSION

In our study, we compared the efficiency of tissue sealant 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 extravasation, bleeding, blood transfusion and prerenal haemotarnia 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 P value 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 sealant 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 mean drop in HB & blood transfusion or complications on both groups [14]. Also others after many studies came to the conclusion that sealing nephrostomy tract with surgical after totally tubeless PNL did not decrease the bleeding or extravasation form the tract [15, 16].

Table 1: Demographic data of patients and stone characteristics

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

Table 2: Stone site

<table>
<thead>
<tr>
<th></th>
<th>First group</th>
<th>Second group</th>
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</thead>
<tbody>
<tr>
<td>Pelvis</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Pelvis + Lower calyx</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Pelvis + upper + lower calyx</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Pelvis + mid + lower calyx</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Pelvis + all calyx</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pelvis + upper calyx</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pelvis + mid calyx</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Middle calyx</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mid calyx + L. calyx</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Lower calyx</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Degree of hydronephrosis</th>
<th>Tubeless PNL with tissue sealant</th>
<th>Tubeless PNL without tissue sealant</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. Hydronephrosis</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Mild. Hydronephrosis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Moderate. Hydronephrosis</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Severe. Hydronephrosis</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Pearson chi-square</td>
<td>0.00016</td>
<td></td>
</tr>
<tr>
<td>P value</td>
<td>0.997</td>
<td></td>
</tr>
</tbody>
</table>
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