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Original Article

Clinical analysis of 48-h emergency department visit post outpatient extracorporeal shock wave lithotripsy for urolithiasis

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Abstract

Background: Patients suffering from renal or ureteral stones can undergo significant discomfort, even when timely diagnosed and treated. The aim of this study was to assess the risk factors and safety of outpatient Extracorporeal Shock Wave Lithotripsy (ESWL) in the management of patients with renal or ureteral stones.

Methods: In this study, our cohort consisted of 844 outpatients who underwent outpatient ESWL treated between February 2012 and November 2014 at Taipei Veterans General Hospital. Patients who visited the emergency room (ER) within 48 h after Outpatient ESWL were included in this article. This article analyzes the stone size, stone shape (long to short axis ratio), stone location, previous medical management, urinalysis data, complications and treatment received in the emergency department.

Results: Among the 844 initial consecutive patients who underwent outpatient ESWL a total of 1095 times, there were 22 (2%) patients who sought help at our emergency room within 48 h after the outpatient ESWL. Of those 22 patients, the mean age was 54.3 ± 12.6 years, and the BMI was 25.9 ± 3.2. The most common complication complaint was flank pain (55.2%). Other complications included hematuria (13.8%), fever (17.2%), nausea with vomiting (6.9%), acute urinary retention (3.4%) and chest tightness with cold sweating (3.4%). In 22 patients who went back to the ER, 7 patients were admitted to the ward and 1 patient again returned to the ER. All patients received medical treatment without ESWL or surgical management. The meaningful risk factor of ER-visiting rate following outpatient ESWL within 48 h was stone location, and the renal stones showed statistic significant ($p = 0.047$) when compared to ureteral stones.

Conclusion: Our study indicated that renal stone contributed to a significantly higher risk of ER-visiting rate to patients than did ureteral stone, following outpatient ESWL within 48 h. This study confirmed that Outpatient ESWL is a safe treatment for renal or ureteral stones, while inpatient ESWL is not absolutely necessary.

Keywords: Complication; Extracorporeal shock wave lithotripsy; Outpatient

1. Introduction

Extracorporeal shock wave lithotripsy (ESWL) was first introduced into medical standard practice for renal or ureteral stone in the 1980s. Since then, ESWL has become one of the main treatment options for patients with urolithiasis. However, with the progress and increased safety and success

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rates of endourology and minimally invasive surgeries, the applicability of ESWL was gradually reduced. Therefore, it has become necessary to search for the relative risks and careful selection of candidates for ESWL in order to optimize the results of this procedure, and prevent complications.[1,2]

Previously, patients used to receive ESWL treatment after admission into our hospital, and they required hospitalization for more than 48 h after treatment. As the skills and experience of surgeons have advanced, we changed the treatment policy from 2-day admission to outpatient ESWL beginning in February 2012. The large majority of current articles have discussed those complications within 1 week or longer after ESWL. Our study focused on the complications and risk factors within 48 h after ESWL. This study design can be attributed to the fact that most patients admitted for ESWL were hospitalized 48 h after the ESWL treatment. We aimed to analyze whether administration was needed for ESWL under the indication of renal−ureteral urolithiasis.

2. Methods

2.1. Data collection

We retrospectively reviewed patients who received outpatient ESWL at Taipei Veterans General Hospital between February 2012 and November 2014. Ultimately, 844 patients were enrolled and were treated with the Dornier compact Delta II lithotripter; the number of shocks administered was 3000−3200 shockwaves per session. We evaluated the images of plain abdominal films of the kidney, ureter, and bladder (KUB), intravenous urogram (IVU), ultrasonography or non-contrast (unenhanced) CT. Since outpatient ESWL was a case-payment procedure, all patients had the lab data, examination data and image reports that we needed. If the patient had taken any anti-coagulation, antiplatelet or thrombolytic agent such as aspirin or Warfarin, the medication was discontinued for 7 days prior to ESWL. We did not prescribe antibiotic before or after the ESWL. Contraindications for ESWL included pregnancy, untreated urinary tract infection or urosepsis, uncontrolled arrhythmia, decompensated coagulopathy, and abdominal aortic aneurysm > 4.0 cm,[3] as referenced by the American Urological Association Stone Guidelines Panel. Of course those customary other suitable treatment methods should routinely be proposed in the event any of these conditions were presented.

Informed consent was obtained from all patients before starting the ESWL treatment. All ESWL treatments were carried out under intravenous general anesthesia (IVGA) of Pethidine (duration 120−150 min), Dormicum (duration 1−6 h) or Propofol (duration 5−10 min) prior to procedure. The treating anesthesiologist decided the appropriate anesthetic regimen according to the condition of each individual patient, and all patients were treated on an outpatient basis. Among these patients, those who visited the ER within 48 h after the Outpatient ESWL were included. The study protocol was approved by the institution review board of TPEVGH (VGHIRB No.: 2016-02-010CCF).

2.2. Study population

A patient group comprising subjects who did not seek help at the ER was selected for comparison with patients who visited the ER within 48 h after the outpatient ESWL. There were 108 patients randomly selected and matched by age, BMI and gender with a confidence level of 95% and a confidence interval of 9.4%.

Parameters of age, sex, body mass index (BMI), stone side, ureteral and renal stone number, stone height, stone width, stone shape (height and width ratio), stone management, serum creatinine (Cr), pre-ESWL hydronephrosis, diabetes mellitus (DM), hypertension (HTN), cardiovascular disease (CAD), Pre-ESWL serum creatinine level (Cr), urine analysis data including urine PH value, urine white blood cell counts (WBC), urine red blood cell counts (RBC), urine pus cell counts, and urine protein before ESWL were investigated. Subsequently, the chief complaint, complications and ER treatments were assessed and recorded.

2.3. Statistical analysis

Statistical analysis was performed using the IBM SPSS ver. 20.0 (IBM Co., Armonk, NY, USA); the Chi-square test, Fisher's exact test and two-sample *T*-test were used. Additionally, univariate analysis was performed. The difference was considered statistically significant when the p value was less than 0.05.

3. Results

There were 844 patients with complete laboratory and image data who were treated with outpatient ESWL at Taipei Veterans General Hospital between February 2012 and November 2014. Of these 844 patients, a total of 1095 outpatient ESWL procedures (times) were performed. We used "times" rather than patient number to describe the ratio of ER visiting rate within 48 h post outpatient ESWL. There were 22 patients who visited the ER within 48 h after the outpatient ESWL, for a rate of 2%. In these patients, 19 patients received ESWL for renal stone and 3 patients for ureteral stone. The mean renal stone size was 12.2 ± 5.9 mm, and the mean ureteral stone size was 6.1 ± 0.2 mm. The demographic data are described in Table 1. In patients who returned to the ER, the mean age was 54.3 ± 12.6 years, BMI was 25.9 ± 3.2, pre-ESWL Cr was 0.89 ± 2.54 mg/ml, post-ESWL Cr was 1.04 ± 0.23 mg/ml, and stone height/width ratio was 1.80 ± 0.57. In total, 451 patients had right side stone, and 14 (14/465 = 3.0%) patients had left side stone. There were 2 patients who returned to the ER with DJ insertion before ESWL. In the control group, 5 patients had DJ insertion before ESWL.

We analyzed parameters between the two groups as Table 1. There was no statistically significant risk factor for age,

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