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EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY (ESWL) VERSUS LITHOLOPAXY (LL): WHICH IS A BETTER TREATMENT OPTION FOR "VESICLE CALCULI"

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Abstract:

Objective: *Aim of the research was to compare the ESWL "Extracorporeal Shock Wave Lithotripsy" outcomes and litholopaxy (LL) in the treatment of "Vesicle Calculi".*

Methods: *Total hundred cases were studies at Services Hospital, Lahore (September 2016 to October 2017). These patients were divided into two equal groups respectively ESWL & LL. The only analgesia was used for the treatment of ESWL; whereas, preoperative antibiotic, a single dose of general anaesthesia was used for the LL. Impact shock waves were generated with the help of Lithotripter (per session 3500 shock waves). All cases of ESWL were treated with Lithotripter. Postoperative cases and post ESWL cases experienced ultrasonography and radiography as required on the fourth day of the follow-up visit for the evaluation of clearance of stone in the patients.*

Results: *Both groups had a respective mean age of (38±10) years and (40±10) years. Both groups had the same male to female ratio and size of the stone. Fever was observed as (2 %) in the ESWL group; whereas, in twenty-four hours 4 % cases went to emergency and LUTS was observed in (4 %) cases. The auxiliary procedure was required in 36 patients. Whereas in the group of LL patients fever was observed in (6 %) cases, LUTS in (4 %) and emergency visits were (6%). Single procedure clearance was observed in 34 cases, the repeated procedure was carried out in 4 cases and retention of small particles was observed in 10 cases with an ultimate choice of ESWL. ESWL and LL groups presented a stone-free rate respectively as 76 % and 72 %. The rate of complication was in ESWL and LL group respectively 10 % and 20 %. ESWL is a twenty-five per cent cheap procedure than LL.*

Conclusions: *As a modality, ESWL in comparison to LL is a better option for the treatment of two centimetres of vesicle stones regarding complications, efficacy, cost and clearance of stones.*

Keywords: *Extracorporeal Shock Wave Lithotripsy (ESWL), Litholopaxy (LL) and Vesicle Calculi.*

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INTRODUCTION:

Globally the Urolithiasis is taken as a regular issue among healthcare. Pakistan is in the region of Afro-Asian countries stone belt that stretches from Iran, Egypt, Thailand, India to Indonesia. Minimal invasive modalities are famous among numerous available vesicle stones management strategies. In the availability of advanced methods traditional open surgery is becoming archaic. With the introduction of ESWL, all calculi types treatment has been revolutionized [1]. A viable alternative to ESWL in case of urinary calculi is the combination of intracorporeal lithotripsy and endoscopy [2]. Numerous other modalities include lasers and electrohydraulic, pneumatic & ultrasonic lithoclast. Moreover, LL with litho-punch is also considered as an effective modality to treat vesicle calculi [3]. Open surgery was the only option before ESWL to treat calculi. Since the introduction of ESWL, it has become the first choice of urologists to treat ureteral, vesicle and renal stones [4 – 7]. Among all available endoscopic and open procedures, ESWL is considered as less anaesthesia exposure, minimally invasive and stone-free rates [8 – 10].

EWSL efficacy is in the pulverize calculi vivo ability into small fragments that can be expulsed suddenly [11]. The generation and focus of the shock waves are pointed within the body. Propagation takes place with almost negligible energy dissipation which causes almost no difference in the density of the tissue [12]. At the interface of stone- fluid, density has a relatively large variation which is connected with the multiple shockwave concentration in a smaller area, that causes an excessive energy dissipation. Through numerous procedures the tensile strength of this energy causes fragmentation. The repetition of the same mechanism ends in the calculi pulverization in smaller fragments (about < 1 mm); that can be passed through the body without pain [13].

Cystolitholapaxy is a safe and effective procedure manufactured through numerous companies [14]. Which can be used for the pediatric and adult patients with different calibrations for both the patients. The aim of the research was to compare the ESWL **"**Extracorporeal Shock Wave Lithotripsy" outcomes and litholopaxy (LL) in the treatment of "Vesicle Calculi".

PATENTS AND METHODS:

Total hundred cases were studies at Services Hospital, Lahore (September 2016 to October 2017). These patients were divided into two equal groups respectively ESWL & LL. We selected single stone patients with the stone size of (1 – 2) centimetres. All the cases having disorders such as diabetes mellitus (DM), renal failure and hypertension were not included in the research. The only analgesia was used for the treatment of ESWL; whereas, preoperative antibiotic, a single dose of general anaesthesia was used for the LL. Impact shock waves were generated with the help of Lithotripter (per session 3500 shock waves). All cases of ESWL were treated with Lithotripter. Postoperative cases and post ESWL cases experienced ultrasonography and radiography as required on the fourth day of the follow-up visit for the evaluation of clearance of stone in the patients. Patients were told about the production of noise during the procedure of ESWL. In the beginning, slow rate of shock wave impact was produced with very less pain factor and step by step shockwave impact was taken to eighty per minute. At an interval of five hundred shocks, we carried out the inspection of the Fluoroscope. Every patient was given 3500 shocks and it was limited to 4000 in case of requirement. Patients collected the stone at the end of the procedure.

Every case was treated with radiography of the kidney ureter bladder before the operation. We documented the location and size of the kidney through USG or excretory urography. After the operation patients experienced x-rays KUB radiography and USG at follow-up after four weeks. Complete stone removal was the outcomes of the treatment. Independent variables were compared in percentage (P-value 0.05).

RESULTS:

Both groups had respective mean age of (38±10) years and (40±10) years. Both groups had the same male to female ratio and size of the stone. Fever was observed as (2 %) in the ESWL group; whereas, in twenty-four hours 4 % cases went to emergency and LUTS was observed in (4 %) cases. The auxiliary procedure was required in 36 patients. Whereas in the group of LL patients fever was observed in (6 %) cases, LUTS in (4 %) and emergency visits were (6%). Single procedure clearance was observed in 34 cases, the repeated procedure was carried out in 4 cases and retention of small particles was observed in 10 cases with an ultimate choice of ESWL. ESWL and LL groups presented a stone-free rate respectively as 76 % and 72 %. The rate of complication was in ESWL and LL group respectively 10 % and 20 %. ESWL is a twenty-five percent cheap procedure than LL.

Meantime elapsed in the procedure in ESWL and LL group was respectively (39.6 ± 11.9) and (37.2 ± 13.0) minutes with a respective time range of (18 – 80) and (15 - 79) minutes ($p < 0.07$). Mean size of the stone was observed in ESWL and LL group respectively (1.6 ± 0.2) and (1.5 ± 0.2) centimeters ($p < 0.08$). Repeated treatment was needed in twenty percent of the population; whereas, ancillary treatment was given to 28% of LL group patients. LL had more expenses than ESWL about 25%. Total of 96% cases was cleared in the first attempt and no extra treatment was required in these cases in ESWL; whereas, LL group was more than 80% recovered in the first procedure. Detailed analysis of the outcomes has been made in the tabular data.

Table – I: Mean Age Male to Female Ratio, ESWL, NE Size

Variable	ESWL Group		LL group		P-Value
Mean Age (YRS)	38.4		40.7		0.41
Sex ratio	Male	Female	Male	Female	0.4
	1.9	1	1.4	1	
Mean Stone Size	1.6		1.4		0.06

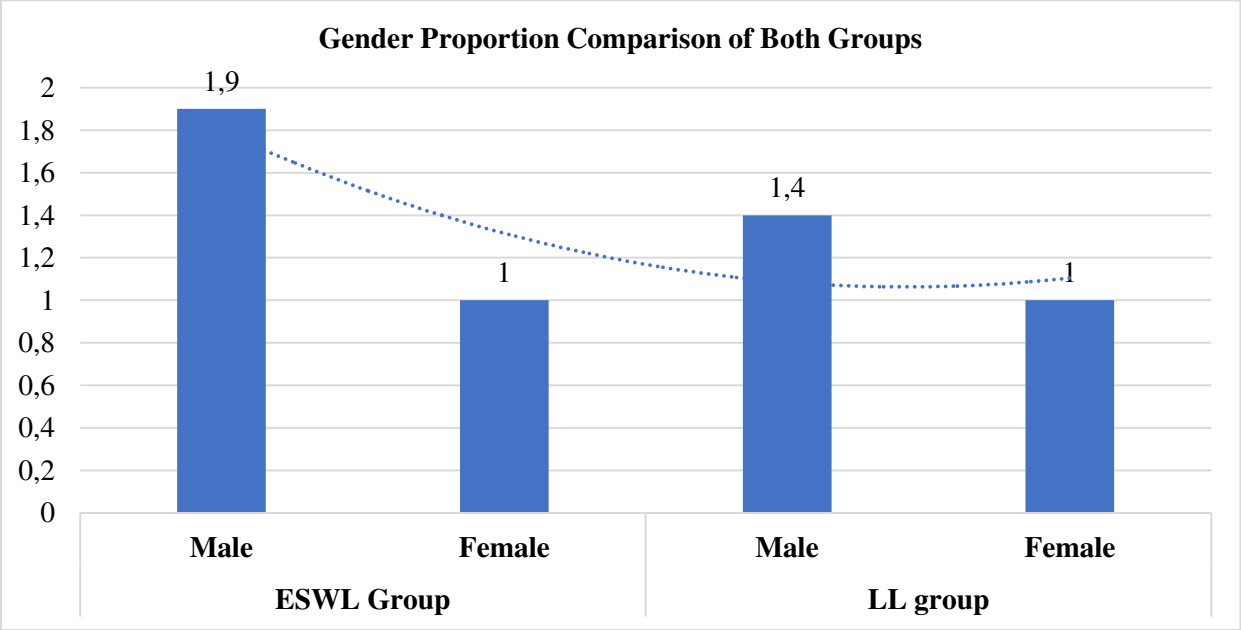
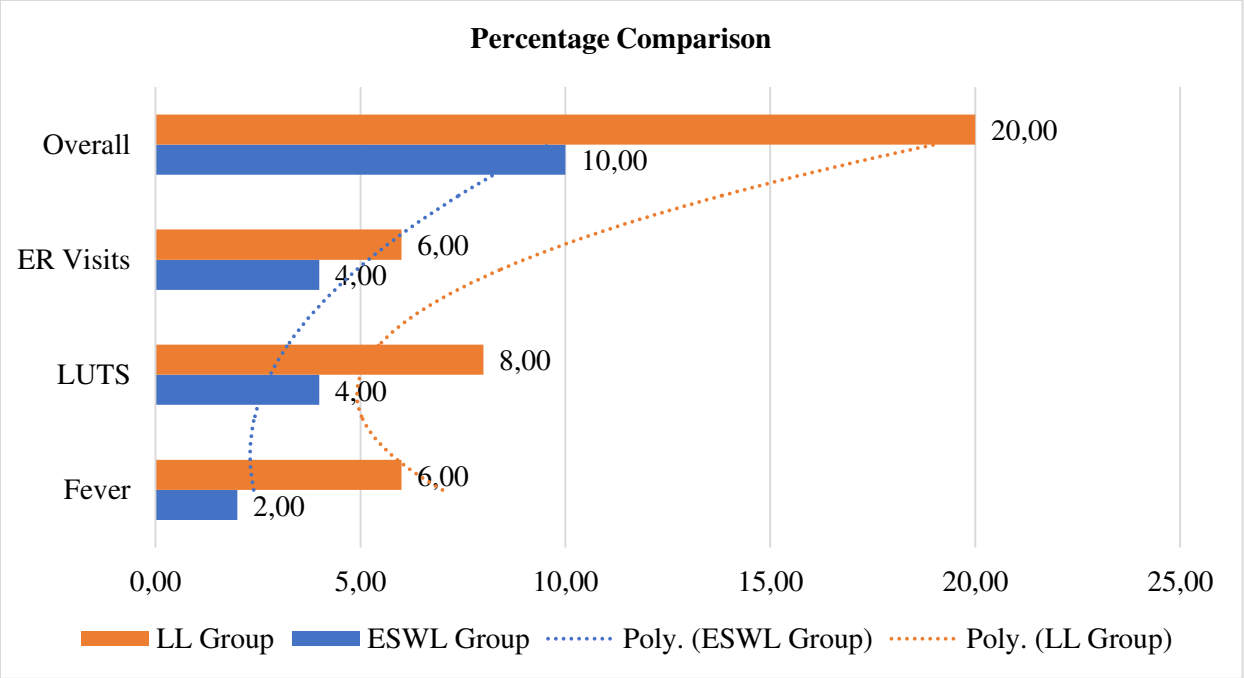


Table – II: Various Variables

Variables	ESWL Group	LL Group	P-Value
Fever	2.00	6.00	0.05
LUTS	4.00	8.00	
ER Visits	4.00	6.00	
Overall	10.00	20.00	



DISCUSSION:

It has become possible to treat urinary bladder stones through ESWL. This procedure is virtually atraumatic. The main benefit of this process lies in it's under analgesic completion [15]. There are four major components of any machine of the lithotripsy including shockwave generation component, system of focusing, imaging and coupling system. Total three ways of the shockwave generation exist such as by using electrical hydraulic generator. In this process, high voltages is passed through vaporization bubble (spark-gap electrode) with immediate expansion and collapse which results in the shape of higher energy pressures. Mechanical stress helps in the production of electricity which was demonstrated back in 1880. Piezoelectric effect crystals or ceramics filled in the container of water and stimulation is carried out through electric pulses of higher frequencies. Ultrasonic vibrations are created through changing strain and stress in the material and thus result in the form of shockwaves. In the electromagnetic generator through the application of higher voltage on the electromagnetic coil in the same way as it happened in the stereo loudspeaker. Either through primary or secondary coil higher frequencies of the vibration are generated in the metallic membrane nearby, which is then transferred to the medium of wave propagation (water).

Generated shockwave is directed through focusing system at focal volume asynchronously. The ellipse geomantic principal is applied in the majority of the lithotripters. Creation of the shockwaves is carried out at F1 focal point and at F2 it is converged. A three-dimensional area is used as blast part where fragmentation and concentration of the shockwaves occur. Varies densities have different energy lost in the transmission and propagation process. Coupling system helps in the reduction of energy loss because the skin surface is transverses through it. Water is used as a medium as its density is close to the density of the tissues. Stone localization is made through imaging system; it also directs the produced waves on calculus. It also helps in the treatment progress tracking and in the selection of possible alternative fragments of the stone. Ultrasonography and fluoroscopy are other two techniques to localize the stone.

The Lithopuch gained popularity back in 1970. Numerous other colourful and creative transurethral devices were also developed with the advancement of the technology which leads to the development of fenestrated lithotripter [16]. With the help of this instrument fragmentation and excavation of the stone became possible through bladder via mettle or glass suction bottles. Manual suction process was first developed by Sir Crampon (1834). The popularity of the mechanical crushing was popular till 1970s with added complications in case of a less proficient urologist [17]. With the intake of better methods designs were made safe and effective.

CONCLUSIONS:

As a modality, ESWL in comparison to LL is better option for the treatment of two centimetres vesicle stones regarding complications, efficacy, cost and clearance of stones. More and multi-centers research studies are required for the assessment of ESWL for a stone size of above two centimetres.

REFERENCES:

1. Delius M, This month in investigative urology: effect of Extracorporeal shock waves on the kidney. J Urol. 1988:140(2):390.
2. Lingeman JE, Zafar FS, Lithotripsy systems. In: Smith AD, Badlani Gh, Bagley DH. Smith's Textbook of Endourology. St Louis, Mo: Quality Medical Publishing; 1996:553-89
3. Hofmann R, Olbert P, Weber J, Varga Z Clinical experience with a new ultrasonic and lithoclast combination for percutaneous litholopaxy. BJU Intl. 2002;90(1):16-9
4. Parkin J, Keely FX, Timony AG. Analgesia for shock wave lithotripsy. J Urol.2002;167(4):1613-5
5. Schwartz BF, Stoller ML. The vesicle calculs. Urol Clin North Am. 2000;27(2): 333-46.
6. Bhatia V, Biyani CS. Vesicle Lithiasis: open surgery vs Cystoloithotripsy Vs ESWL therapy. J Urol. 1994; 151(3):660-2
7. Anagnostou T, Tolly D. Management of ureteric stones. Eur Urol. 2004; 45960:714-21
8. Chaussy CG, Fuchs Gj, Current state and future development of noninvasive treatment of human urinary stones with ESWL. J urol. 1989;141(3 Pt2): 782-9
9. Joshi HB, Obadeyi OO, rao PN. A comparative analysis of nephrostomy, JJ stent, and urgent in situ ESWL for obstructing ureteric stones. BJUInt.1999;84(3):264-9
10. Naqvi AA, Khaliq M, Zafar MN, Rizvi SAH. Pneumatin Lithotripsy: anew modality for treatment of ureteric stones. J pak Med assoc1995:45:9-11
11. Lindqvist K, Holmberg G, Peeker R, Grenabo L. Extracorporeal shock wave lithotripsy or ureterostomy as primary treatment for ureteric stones: a retrospective study comparing two different treatment strategies, Scand J Nephrol.2006:40(2): 113-8
12. Auge BK, Preminger GM, Update on shockwave lithotripsy technology. Curr Opin Urol.2002:12(4): 287-90
13. Chaussy C, Schuler J, Schmiedt E, Brandl H, Jocham D, Liedl B. Extracorporeal Shockwaves Lithotripsy ESWL for treatment of Urology1984;23;59-66.
14. Segura JW, Preminger GM, Assimos DG, Dretier SP, Kohn RI, et al. Ureterol stones clinical guidelines panel summary report on the management of ureteral calculi. J Urol1997;158;1915-21.
15. Samiullah, Ishtiaq A. Comparison of open vesico lithotomy & Cystolithopaxy. Pak J med Sci2007;23(1);47-50.
16. Mahmood Y, Zubair M, Maria S, Ali M, Hassan R Feasibility and Effectiveness of ESWL for selected vesicle calculi. Pak J Surg2007;23(3):192-4
17. Abe T, Akakura K, Kawaguchi M, Ueda T, Ichikawa T, Ito H, et al. Outcomes of shock wave lithotripsy for upper urinary tract stones: a large-scale study at a single Institution. J Endourol.2005; 19970:768-93