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EXTRACORPOREAL SHOCK LITHOTRIPSY (ESWL)

ESWL achieves stone fragmentation by utilizing **shock waves** generated by a sophisticated spark plug electrode situated within a lithotripter device. These shock waves, produced externally to the human body by the lithotripter, converge onto the stone, resulting in its fragmentation.

The success of the ESWL depends on 3 main factors:
- **Size, location and composition of the stone.**
- **Body composition.**
- **Shock wave application technique.**

CONTRAINDICATIONS:

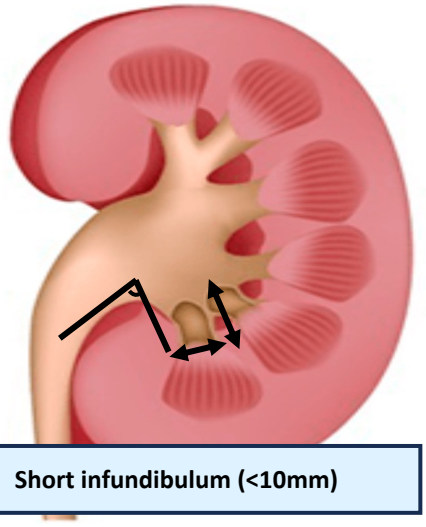
- **Pregnancy**
- **Nearby aoartic aneurysm**
- **Morbid obesity**
- **Severe skeletal malformations**
- **Hemorrhagic diathesis**
- **Urinary sepsis**
- **Anatomical obstruction distal to the lithiasis**
- **Stones refractory to ESWL** (cystine, calcium oxalate monohydrate and brushite)

*Relationship between SWL and hypertension or diabetes is unclear. **There is no evidence to support the hypothesis that ESWL can cause long-term adverse effects.**

INDICATIONS:

- **Lithiasis <2cm.** Its effectiveness is reduced if the attenuation coefficient is >1000 HU in CT or the distance from the skin to the stone is >10cm.

- **Lithiasis of the lower calyx <10mm or 10-20mm as long as there are favorable factors for its subsequent expulsion:**



- **Short infundibulum (<10mm)**
- **Favorable infundibulopelvic angle** (>45º)
- **Wide calyceal infundibulum (>5mm)**

PROCEDURE AND CONSIDERATIONS

Reducing shock wave frequency to 60-90 per minute may improve the **Stone-Free Rate (SFR)**. **The optimal number of shock waves is not established.**

Ultraslow frequency of 30 shock waves/min can increase SFR.

1-3 minutes intermission after the initial 200-300 shock waves can prompt renal vasoconstriction, lowering the likelihood of vascular injury. The subsequent shock wave intensity should be gradually increased—ramping technique—tailored to patient tolerance, stone's location, and manufacturer's guidance.

Ensuring proper acoustic coupling between the treatment head pad and the patient's skin is crucial. Any defects, such as air pockets in the coupling gel, can deflect 99% of the shock waves, significantly reducing treatment efficacy.

TREATMENT

Careful pain control is necessary during treatment to limit pain-induced movements & excessive respiratory excursions.

Medical expulsion therapy may reduce pain medication needs. Mechanical percussion and diuretic treatment can significantly improve SFR and accelerate stone passage after ESWL.

Routine use of **internal stents before SWL does not improve stone free rates (SFRs),** nor lowers the number of auxiliary treatments. It may, however, reduce formation of steinstrasse.

PROPHYLAXIS

No standard antibiotic prophylaxis is recommended before ESWL

PROPHYLAXIS IS RECOMMENDED IN THE CASE OF:
- Internal stent placement before planned treatments
- In the presence of increased bacterial load (e.g., indwelling catheter, nephrostomy tube, or infectious stones).

MOST FRECUENT COMPLICATIONS:

- Steinstrasse 4-7%
- **Regrowth of residual fragments 21-59%**
- Renal Colic 2-4%
- Bacteriuria in non-infection stones 7.7-23%
- Sepsis 1-2.7%
- Symptomatic haematoma <1%
- Asymptomatic haematoma 4-19%