Bradford Teaching Hospitals
NHS Foundation Trust

Sonography Led Extracorporeal Shockwave Lithotripsy (ESWL)

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Introduction

The ESWL service in Bradford has been running for many years and with the advent of ultrasound guided systems for lithotripsy in 2006 the expertise of sonographers at Bradford was sought to enable the treatment to be used with this non-ionising method of imaging.

Ultrasound is deemed to be a relatively cheap and safe method of imaging, which is readily available and with operator expertise a good tool in guiding ESWL treatment. The real time capability allows for accuracy in stone focussing which increases the success of the treatment, and with no ionising dose to consider.

As the service evolved so did the sonographer role, we now independently treat once they have been consented. All patients are discussed at the Stone MDT which runs every Monday prior to being offered ESWL.

What is ESWL?

The procedure involves firing shockwaves through the skin and focusing them to break kidney stones into small enough fragments to pass naturally; this involves either x-ray or ultrasound to target the stone(s). (BAUS)

Alternatives treatments have different risks and success rates, depending on the size and position of the stone. Ureteroscopic surgery uses laser to break the stone and percutaneous stone removal involves a direct puncture into the kidney through the abdomen to remove stones. Both are done under general anaesthesia.

Rationale for ESWL

NICE guideline (2019) advise that a stone less than 10mm, if not contraindicated, should be treated with ESWL. It results in less hospital stays, less pain for the patients and fewer major adverse effects than surgery. Cost analysis even showed a better balance of benefit and cost even with repeat treatments of ESWL versus surgery. (NHS Improvement, 2018).

NICE Guideline for Renal and Ureteric stones

Stone type and size	Treatment for adults (16 years and over)	Treatment for children and young people (under 16 years)
Renal stone less than 10 mm	Offer SWL Consider URS: • if there are contraindications for SWL **or** • if a previous course of SWL has failed **or** • because of anatomical reasons, SWL is not indicated Consider PCNL if SWL and URS have failed to treat the current stone or they are not an option	Consider URS or SWL Consider PCNL if: • URS or SWL have failed **or** • for anatomical reasons, PCNL is the more favourable option
Renal stone 10 to 20 mm	Consider URS or SWL Consider PCNL if URS or SWL have failed	Consider URS, SWL or PCNL[1]

Lithotripsy treatment room

Technique / Procedure

A Clinician will consent the patient for 3 sessions of ESWL on 1st attendance, the sessions are then conducted by a sonographer and a ward nurse.

The nurse will admit and prepare the patient for treatment. Together they then carry out an interventional procedure checklist, prior to treatment.

The checklist involves assessing previous imaging on the radiology system, referral to confirm side for treatment on the electronic patient records system, patient medical history/allergies and recording of relevant clinical observations.

The patient is prepped with analgesia if required and changed into a gown. The stone is identified using ultrasound for kidney stones and image intensifier for ureteric or bladder stones. Once the stone is visualised and deemed suitable for treatment the patient is asked to lie supine on the couch and water is placed directly under them – this is required for transmission of treatment from the lithotripter.

The treatment head is set under the patient and focusing is done by the Sonographer using either the inline ultrasound probe or image intensifier. Once the stone is in position the treatment starts at a frequency of 1 shockwave per second (1s) at a power of 10MHz. 4000 shockwaves are required for a complete treatment. The power is incrementally increased to 50MHz for renal stones (70MHz for ureteric stones). The frequency is increased to 2s if the patient can tolerate.

The sonographer ensures the stone stays in focus and that the patient is comfortable throughout the treatment.

Once treatment is complete the patient is advised to drink plenty to aid in stone passage and is discharged by the nurse once another set of clinical observations are done.

Follow up sessions are done at 2-3 week intervals, stone appearance is assessed prior to treatment by the Sonographer to assess for any change, and if the stone has passed or the remaining fragment is <4mm no further treatment is required.

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