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Effectiveness and tolerability of Extracorporeal Shockwave Lithotripsy for treatment of renal stone – does location of stone matters?

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Introduction

- Extracorporeal Shockwave lithotripsy (ESWL) is a 1st line treatment for renal stone
- Knowledge on stone free rate (SFR) and safety affects choice of treatment, however evidence from past studies varies.
- More recent studies suggest SFR ≈ 70-90%
 - Affected by number of sessions, definition of SFR, patient and disease factors
- Conflicting evidence of impact of stone location on SFR

Objectives

- Determine the impact stone location and other factors on
 - SFR after 1st and multiple session
 - Use of IV fentanyl during 1st ESWL session
 - Complications after 1st ESWL session

Patients & Methods

- 173 patients receiving ESWL for renal stone in Queen Mary Hospital between 2013-15 were included
- Patients were excluded if they were loss to follow-up for 1st ESWL session
- Stone free is defined as stone fragment < 4 mm without retreatment at least 6-week post-ESWL
- ESWL is routinely done without analgesia
- Disease characteristics, ESWL detail and outcome, post-ESWL self-reported complications were analysed

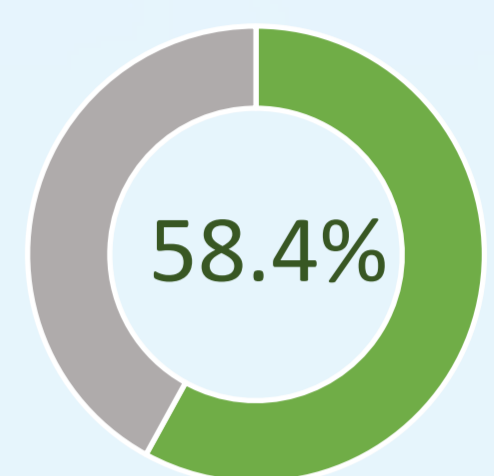
Results

- Mean age = 54.9, 60.1% (n = 104) are male
- SFR is 58.4% (1st session) and 86.7% (multiple session), mean session to achieve stone free is 1.5
- 8.7% (n = 15) undergo auxiliary treatment (PCNL or RIRS)
- Lower pole stone does not have lower SFR** (p = 0.545)
 - Stone size < 10mm: 68.3% vs 76.9%, p = 0.388
 - Stone size ≥ 10mm: 45.8% vs 46.7%, p = 0.936
- Other negative predictors of stone free include stone size ≥ 10mm (p < 0.001), hydronephrosis (p < 0.001), abnormal kidney anatomy (p = 0.005)
- Multivariate analysis shows similar findings
- Only 33.3% patients require intra-ESWL analgesic, in which none require early termination of ESWL
- Stone location does not affect use of analgesic** (p = 0.18)
- Only 28.3% patient self-reported any complication
- Stone location does not affect complication rate** (p = 0.79)
- Common complications include loin pain (n = 27), haematuria (n = 21) and dysuria (n = 9)
- Most complications are mild (Clavien-Dindo grade I) and does not require additional treatment

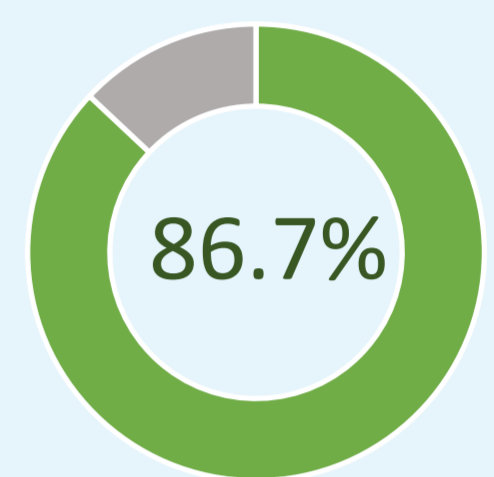
Conclusion:

ESWL is a good 1st line treatment for renal stone, but patients need to be counselled on SFR after 1st session as it may not be as high as some published literature. Stone location is less important in determining choice of treatment

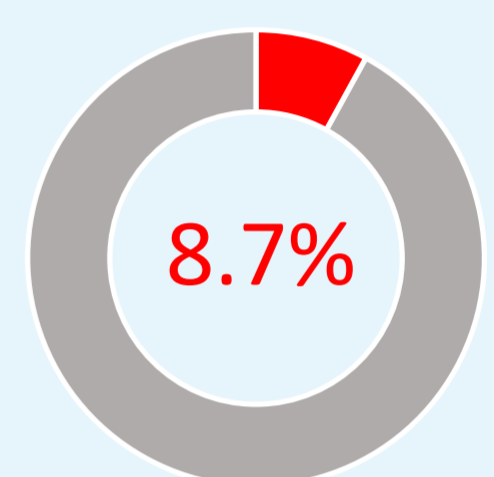
SFR after 1st session



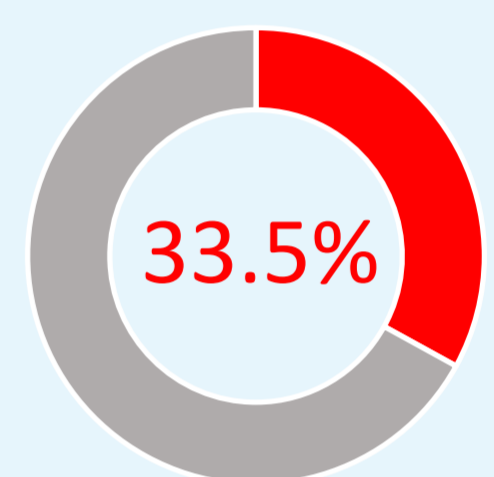
SFR after multiple session



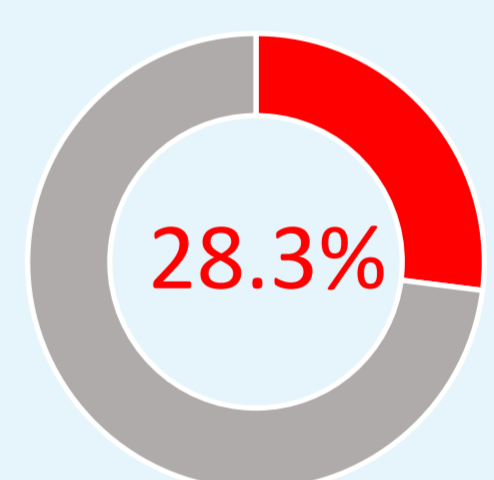
Auxiliary procedure rate



% patient require IV fentanyl



% patient self-report complication



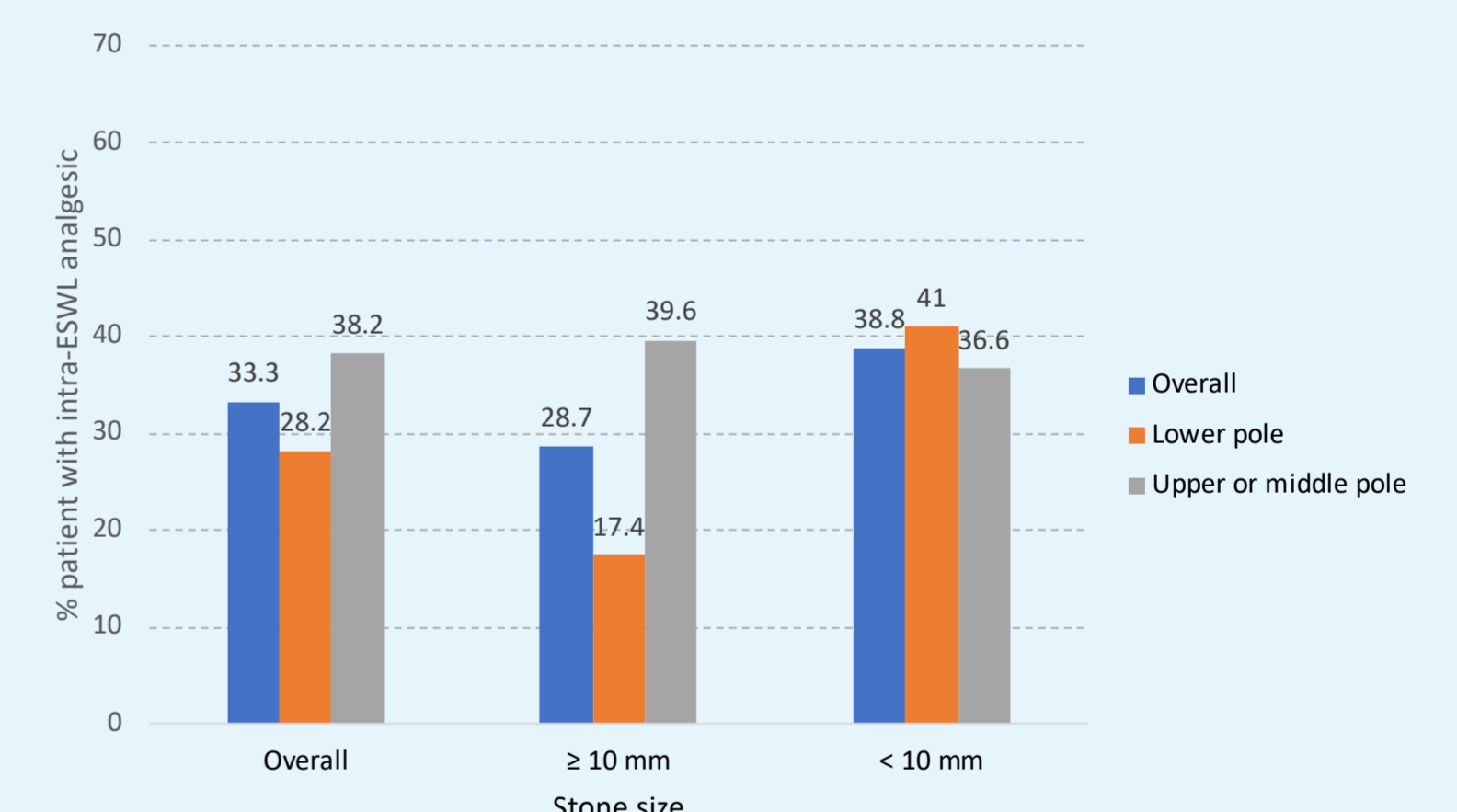
Univariate analysis for SFR after 1st session

| | | SFR | p-value |
|-------------------------|------------------------------|------|---------|
| Stone location | Low pole (n = 84) | 60.7 | 0.545 |
| | Upper & middle pole (n = 89) | 56.2 | / |
| Stone size | ≥ 10 mm (n = 93) | 46.2 | < 0.001 |
| | < 10 mm (n = 80) | 72.5 | / |
| Hydronephrosis | Yes (n = 38) | 28.9 | < 0.001 |
| | No (n = 135) | 66.7 | / |
| Abnormal kidney anatomy | Yes (n = 11) | 18.2 | 0.005 |
| | No (n = 162) | 61.1 | / |
| History of ESWL | Yes (n = 61) | 63.9 | 0.274 |
| | No (n = 112) | 55.4 | / |
| Pre-ESWL JJ stent | Yes (n = 17) | 52.9 | 0.588 |
| | No (n = 154) | 59.7 | / |
| Number of shockwaves | ≥ 3000 (n = 153) | 57.5 | 0.523 |
| | < 3000 (n = 20) | 65 | / |

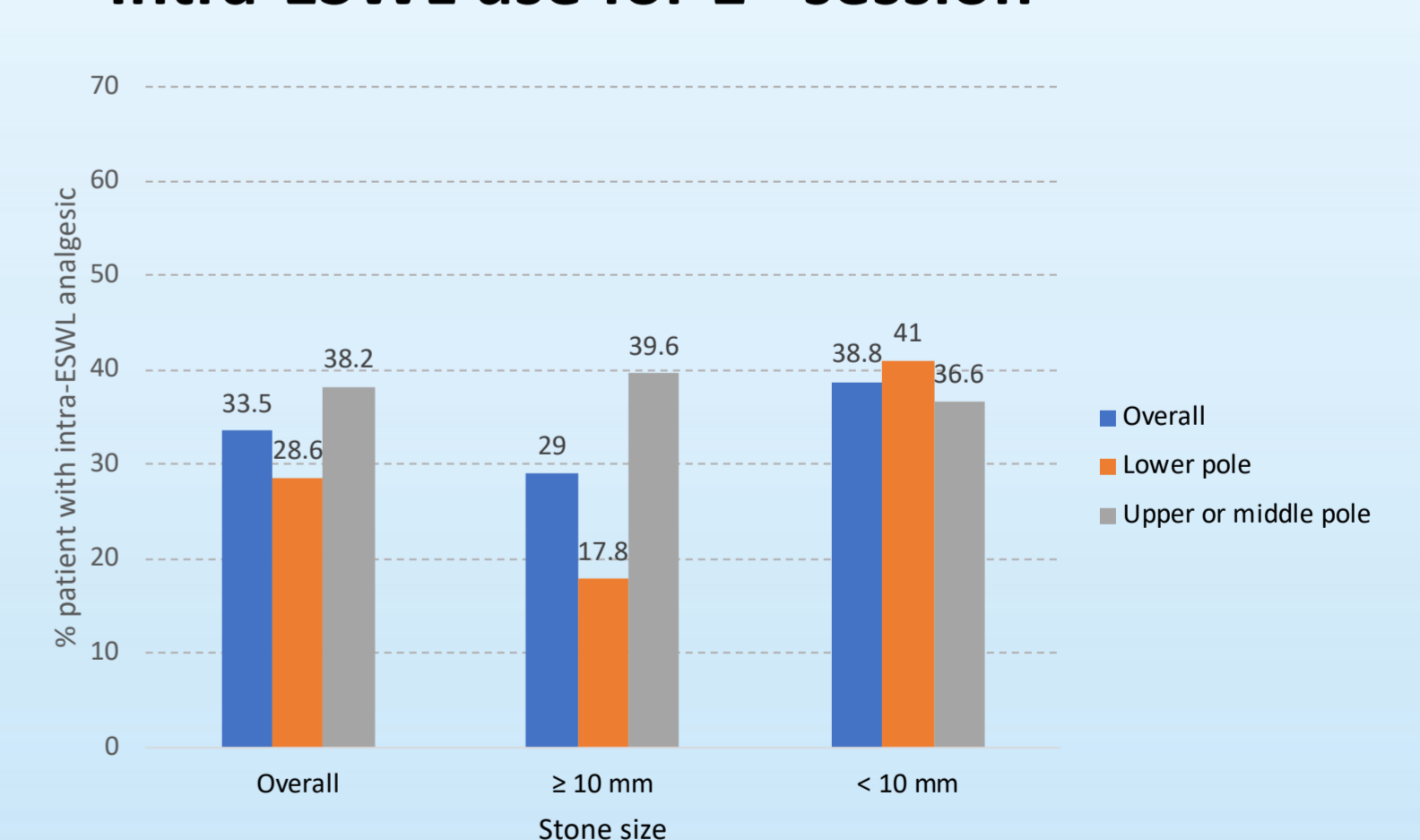
Multivariate analysis for SFR after 1st session

| | | OR | p-value |
|-------------------------|---------------------|---------------|---------|
| Stone location | Low pole | 1.048 | 0.891 |
| | Upper & middle pole | 1 (reference) | / |
| Stone size | ≥ 10 mm | 0.481 | 0.036 |
| | < 10 mm | 1 (reference) | / |
| Hydronephrosis | Yes | 0.242 | 0.001 |
| | No | 1 (reference) | / |
| Abnormal kidney anatomy | Yes | 0.171 | 0.033 |
| | No | 1 (reference) | / |

SFR after 1st session



Intra-ESWL use for 1st session



Complication for 1st session

