Initial Experience with a New Dual Shockwave Lithotripter in the Management of Upper Urinary Tract Calculi

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Introduction:
- New dual shock wave lithotripters. (Duet, Direx) installed at Darent Valley Hospital since August 2007.
- We report our preliminary results with this new lithotripsy technology in the management of upper urinary tract calculi.
- The lithotripter has two independent generator/reflector system at 72° to each other.
- It can be used in synchronous (simultaneous) or asynchronous (alternate) modes.
- The dual shock waves produce a butterfly shaped focal volume which contributes to better fragmentation. And probably lower kidney damage.
- Initially we used the Duet Electrohydraulic version but lately we started to use the Duet Magna Electromagnetic version.

Material and Method:
- Data was collected prospectively from 184 consecutive patients undergoing ESWL from August 2007 to September 2009 - performed under analgesia at 240 shock waves/min (120 shock waves/min/head).
- All patients were reviewed in the clinic at 4-6 weeks post ESWL with an X-Ray KUB.
- Stone free rates (success) was defined as completely stone free or with fragment < 3mm.

| Total number of patients studied | 177 |
| Male : Female ratio             | 130:47 |
| Mean Stone size                 | 8.51 mm (range 4-19 mm) |
| Mean shock wave time            | 13 minutes |

Results:
Of the 184 patients: 152 had a single session, 23 had two sessions & 2 of them had 3 sessions. 7 were excluded from the study (3 did not tolerate the analgesia & 4 had parenchymal stones). Twenty nine patients had a ureteric stent in situ. The stone distribution included upper calyceal (10%), mid calyceal (11%), lower calyceal (60%), renal pelvic (14%) and proximal ureteric (5%). The dual shockwave asynchronous mode was utilized in 89% of the patients. Nine patients (5%) did not tolerate the procedure well and one patient was admitted overnight for analgesia. Initial Stone Free rate using the Electrohydraulic version was 78.11%. Lately, using the Duet Magna Electromagnetic Version, (which reduces pain to the patient, allowing the use of higher energy), the Stone Free Rate increased to 83%.

Discussion / Conclusion:
- In an animal model using a Duet lithotripter, the kidney tissue and function were minimally affected by a clinical dose of shock waves delivered in alternating mode (120 shock waves per minute per head and 240 shock waves per minute).
- These observations decrease concern that dual head lithotripsy at a rapid rate is inherently dangerous (Handa et al., 2009 J Urol).
- Dual shock wave lithotripsy is safe, quick and effective in treating upper urinary tract calculi.