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## CLINICIAN AND PATIENT FACTORS AFFECT DOSE OF RADIATION DURING VIDEO URODYNAMICS

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Introduction:
Video urodynamics (VUDS) enables delineation of site and cause of bladder outlet obstruction and/or incontinence as well as additional findings such as vesico-ureteric reflux at the expense of radiation exposure. We have assessed whether clinician and patient related factors affect the total radiation exposure time (RET) and radiation dose (RD) during VUDS.

Patients and Methods:
The RET and RD of all 986 consecutive patients having VUDS to investigate refractory lower urinary tract symptoms (LUTS) between 13/01/2018 and 31/01/2019 were retrospectively reviewed.

Up to 308 (31%) patients were excluded owing to insufficient data or due to additional exposure from adjunct tests.

Clinical Scientists and training Urologists used a standardised Female, Functional and Restorative (FFR) Urology protocol when performing the VUDS whilst the other groups did not.

Total RET and RD were determined and correlated with:

- Speciality and grade of clinician performing the test
- Patient sex, age and presenting symptoms (storage, voiding and mixed)- with a further sub-analysis of the first 300 VUDS for presenting symptoms effect on exposure time.

Furthermore, a Spearman's correlation co-efficient was determined for patient age and RET.

Statistical analysis was by non-parametric tests with post hoc analysis and significance determined at $P<0.001$.

Results:

- 678 patients (413 female) fulfilled the above criteria and their results are listed in Tables 1 and 2.

**Table 1 (*P < 0.001)**

| Clinician Group | NRET (NRD) | Median RET (s) | Median RD (cGy.cm²) |
|---|---|---|---|
| Radiologists | 323(320) | 57.0* | 170* |
| Gynaecologists | 25 | 53.0* | 236 |
| Urologists | 53(52) | 25.0* | 155 |

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|---|---|---|---|
| Clinical Scientists | 281(275) | 26.0* | 116* |
| Radiographers | 6 | 54.0 | 204 |
| Consultants | 101(99) | 66.0* | 258* |
| Training Doctors | 300(298) | 49.0* | 160 |
| Training Urologists | 53(52) | 25.0* | 155 |
| Training Radiologists | 247(246) | 54.0* | 160 |
| Clinical Scientists (non-FFR patients) | 68(95) | 35.0* | 84.6* |

**Table 2 (*P < 0.001)**

| **Patient Characteristics** | **NRET (NRD)** | **Median RET (s)** | **Median RD (cGy.cm²)** |
|---|---|---|---|
| Male | 271 (265) | 44.0* | 174* |
| Female | 417 (413) | 34.0 | 129 |
| Male (with voiding images) | 71/127 (69) | 55.0 | 251 |
| Female (with voiding images) | 53/173 (52) | 58.0 | 232 |
| 15-20 | 33 | 39.0 | 118 |
| 21-30 | 72 | 25.0* | 75.5* |
| 31-40 | 76 (74) | 30.0 | 129 |
| 41-50 | 116 (114) | 38.0 | 159 |
| 51-60 | 164 (162) | 40.0 | 166 |
| 61-70 | 137(134) | 42.0 | 135 |
| 71-80 | 76 (75) | 45.5 | 169 |
| 81-90 | 14 | 50.5 | 199 |
| Storage | 78 (74) | 55.5 | 157 |
| Voiding (with voiding images) | 29 (29) | 65.0 | 286 |
| Mixed (with voiding images) | 44 (43) | 44.50 | 230 |

- There was no significant difference in patient's age, presenting LUTS and sex amongst the groups (except Gynaecologists).
- The rate of non-diagnostic VUDS was similar in all groups and 20% overall.
- There was a significantly strong correlation between age groups and median RET ($\rho=0.9$, $p<0.001$).

Conclusion:

- There is wide variation in total RET and hence RD during VUDS.
- Clinical Scientists and training Urologists have significantly lower RETs and doses whilst Consultants, in particular Radiology Consultants, have significantly longer RETs for the same diagnostic yields. Therefore, patients may benefit from adoption of the FFR urology VUDS protocol to reduce RET and hence RD.
- Men appear to have significantly higher RETs than women consequent to the presence of voiding images and a significantly strong correlation was established between increasing age groups and RET. However, there do not appear to be any other patient related factors associated with increased RET, hence RD.