

Factors Associated With An Increased Radiation Exposure In Adults Undergoing Videourodynamic Studies

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Background

Videourodynamic studies (VUDS) combine pressure-flow assessment with fluoroscopic imaging to evaluate lower urinary tract function. While radiation exposure during VUDS is a concern, there is limited evidence identifying specific clinical or urodynamic factors associated with prolonged fluoroscopy time.

Methods

A retrospective review of 469 adult patients who underwent VUDS at a tertiary center was conducted. Fluoroscopy time, as a proxy for radiation exposure, was recorded for each procedure. Data included demographics (age, gender, BMI), uroflowmetry parameters (bladder capacity, Qmax, PVR), and clinical history (surgical, neurological, incontinence, voiding dysfunction). Univariate and multivariate analyses were performed to identify factors associated with increased fluoroscopy time.

Table-1. Preurodynamic findings

		N %	Mean fluoroscopy time, seconds (±SD)	P value
BMI	<25	181	64,47(37,09)	0,979
	>25	136	64,58(38,61)	
Age	<40	144	61,85 (33,06)	0,944
	>40	325	62,11 (37,14)	
Gender	Female (n)	322	62,45 (35,94)	0,710
	Male (n)	147	61,12 (35,93)	
Voiding symptoms (Voiding dysfunction)	Positive (n)	256	61 (37,37)	0,489
	Negative (n)	212	63,31 (34,18)	
Neurological disease	Positive (n)	116	64,71 (39,14)	0,359
	Negative (n)	352	61,17 (34,84)	
Incontinence	Positive (n)	260	62,18 (33,62)	0,928
	Negative (n)	208	61,88 (38,73)	
Indication for VUD_Neurologic disease	Positive (n)	116	64,71 (39,14)	0,359
	Negative (n)	352	61.17 (34,84)	
Bladder capacity in uroflowmetry	<300	92	65,64 (44,49)	0,578
	>300	108	62,50 (35,29)	
PVR	<150 ml	38	55,89 (29,73)	0,507
	>150 ml	96	60,06 (33,75)	
Qmax	<10	168	64,13 (39,85)	0,933
	>10	34	63,50 (38,56)	

Results

The cohort was 68.7% female, with a mean age of 50.2 years. Mean fluoroscopy time was 62.03 ± 35.90 seconds. No clinical pre-VUD parameters (BMI, age, gender, neurological status, incontinence, voiding symptoms) predicted prolonged fluoroscopy time (Table 1).However, the presence of bladder outlet obstruction(BOO), vesicoureteral reflux (VUR), and urodynamic incontinence significantly increased fluoroscopy duration (Table 2).Male patients with detrusor overactivity (DOA) had longer fluoroscopy times compared to those without (69.67±42.71 s vs. 54.70±28.48 s, p=0.012).

Implications

While clinical characteristics do not predict radiation exposure, VUD findings such as BOO, VUR, and incontinence are linked to increased fluoroscopy time. These conditions require detailed anatomical and functional imaging, which prolongs exposure. Recognizing these risk factors can aid clinicians in counseling patients and tailoring imaging protocols to minimize radiation. Prospective studies are needed to refine safety guidelines in VUDS

Table-2. Urodynamic parameters associated with radiation exposure during videourodynamics

		N %	Mean rad exposure (±SD)	P value
DOA during storage	Positive (n)	201	64,30 (35,23)	0,236
	Negative (n)	268	60,33 (36,37)	
Compliance	Normo (n)	435	61,9 (36,43)	0,782
	Hypo (n)	34	63,68 (28,76)	
Urodynamic bladder capacity	<300 ml	81	58,57 (29,63)	0,341
	>300 ml	388	62,75 (37,07)	
Urodynamic Incontinence	Positive (n)	153	69,29 (37,52)	0,002
	Negative (n)	315	58,61 (34,63)	
Urodynamic Stress UI	Positive (n)	47	68,53 (30,88)	0,187
	Negative (n)	414	61,21 (36,51)	
DOA incontinence	Positive (n)	107	66,79 (38,56)	0,124
	Negative (n)	361	60,71 (35,02)	
Detrusor activity during voiding	Normoactive	275	63,88 (36,50)	0,399
	Hypoactive	113	60,64 (28,78)	
Bladder outlet Obstruction	Positive (n)	78	69,27 (36,93)	0,044
	Negative (n)	388	60,37 (35,15)	
Vesicourethral Reflux	Positive (n)	35	89,06 (65,05)	0,013
	Negative (n)	433	59,92 (31,58)	