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INCOMPLETE BLADDER EMPTYING IN ELDERLY WARDS

Hypothesis / aims of study

1. To determine the prevalence of various degrees of incomplete bladder emptying (IBE) in elderly patients admitted into a convalescent hospital.

2. To determine a reasonable cut-off value of post-void residual (PVR) volume required for further investigations and interventions based on the relationship between PVR and the risk of urinary tract infection (UTI).

Study design, materials and methods

Consecutive patients transferred from acute hospital into 2 elderly wards in a convalescent hospital between August 1 and August 31, 2004 were included in the study. Patients without urinary catheter on admission were screened within 48 hours with a portable ultrasound bladder volume measuring device (BladderScan BVI 3000 from Diagnostic Ultrasound Corporation) to measure the PVR in the supine position immediately or within 15 minutes after micturition. If the patient was on diapers, an enuresis alarm was attached to the diapers to catch the exact timing of micturition.

A urine sample (mid-stream urine if possible, otherwise a catheterize-once urine sample) was sent for routine microscopy and culture within 48 hours of admission to screen for asymptomatic bacteriuria or UTI. Medical records were also traced to determine any documented UTI from 2 weeks before admission and up to 4 weeks after admission into the convalescent hospital.

Results

119 (63 male & 56 female) patients were included in the study. Median age was 77. 51.3% patients were on diapers. 12.6% patients were already on Foley catheter on admission. 9.2% patients were found to have PVR >400ml on admission requiring immediate catheterization. Overall, 21.8% patients were found to have PVR >100ml.

Table 1 Prevalence of IBE at different cut-off values of PVR

	All Patients	**Male**	**Female**	**p-value**
PVR >50 ml	44/119 (37.0%)	29/63 (46.0%)	15/56 (26.8%)	0.037*
PVR >100 ml	26/119 (21.8%)	18/63 (28.6%)	8/56 (14.3%)	0.076
PVR >150 ml	22/119 (18.5%)	16/63 (25.4%)	6/56 (10.7%)	0.057
PVR >200 ml	16/119 (13.4%)	12/63 (19.0%)	4/56 (7.1%)	0.065
PVR >400 ml	11/119 (9.2%)	8/63 (12.7%)	3/56 (5.4%)	0.214

* $p < 0.05$

19.2% and 16.3% patients without Foley catheter on admission were found to have UTI and asymptomatic bacteriuria respectively. There was substantial increased risk of UTI when PVR was >100ml.

Table 2 Prevalence of UTI at different PVR values (excluding those already on urinary catheter before admission)

	All Patients	Male	Female	p-value
PVR ≤50ml	6/60 (10.0%)	0/32 (0%)	6/28 (21.4%)	0.008*
PVR=51-100ml	2/18 (11.1%)	0/11 (0%)	2/7 (28.6%)	0.137
PVR=101-200ml	4/10 (40%)	2/6 (33.3%)	2/4 (50%)	1.000
PVR=201-300ml	1/2 (50%)	1/2 (50%)	0/0	
PVR=301-400ml	2/3 (66.7%)	1/2 (50%)	1/1 (100%)	1.000
PVR=401-500ml	1/3 (33.3%)	1/2 (50%)	0/1 (0%)	1.000
PVR >500ml	4/8 (50%)	3/6 (50%)	1/2 (50%)	1.000
PVR ≤100ml	8/78 (10.3%)	0/43 (0%)	8/35 (22.9%)	0.001*
PVR >100ml	12/26 (46.2%) (p <0.001*)	8/18 (44.4%) (p <0.001*)	4/8 (50%) (p = 0.19)	1.000

* p <0.05

Interpretation of results

IBE is a common problem in elderly patients. However, there is no consensus on what value of PVR should be used. In our study, we have determined the prevalence by using different PVR cut-off values. When the most commonly used PVR cut-off value of 100ml was chosen, the prevalence rate of IBE reached 21.8%. Adding to the number of patients already put on urinary catheter on admission, the total prevalence of voiding dysfunction amounted to 34.4%. 9.2% patients were found in the initial screening to have PVR >400ml requiring immediate urinary catheterization. All these patients were on diapers and the urinary retention was overlooked probably because they were having overflow incontinence. There is a need for screening all elderly patients for IBE on admission into hospitals to identify the problem early and to prevent complications.

In deciding the appropriate cut-off value of PVR, we have to know what purpose of the cut-off values was going to be used: to define normal or abnormal; to decide safe or not safe; to decide whether intervention is needed or not; to define goals of interventions. The later three are more relevant in day-to-day clinical practice where the determining factors are the clinical consequences of raised PVR: increased risk of UTI; increased risk of obstructive uropathy; increased risk of progression into frank acute retention of urine; increased risk of urinary stone formation and the disturbing symptoms of low 'functional bladder capacity' which can mimic an overactive bladder.

In our study, we attempt to determine an appropriate cut-off value of PVR based on the risk of developing UTI and found that 100ml seems to be the most reasonable and practical value.

Concluding message

One-third of patients admitted into the elderly wards were found to have some voiding dysfunctions. Screening of all patients on admission for raised PVR is advisable to identify the problems early and to prevent subsequent complications. PVR of 100ml appeared to be a reasonable and practical cut-off value for elderly patients indicated for further investigations and interventions and also be the minimum goal of any interventions.