

Patients with nocturnal polyuria presented a different night-time and daytime bladder capacity: Implication for nocturia

Presicce Fabrizio, De Nunzio Cosimo, Fabiana Cancrini, Puccini Federica, Melchionna Alberto, Lombardo Riccardo, Tubaro Andrea

Aim

Aim of this study was to subtype patients with nocturia according to daily variations in the urine production and in the bladder capacity (BC).

Materials & Methods

- From 2015 onwards, consecutively patients with ≥ 1 episode of nocturia par day, both gender, aged between 18 and 85 years, were prospectively enrolled.
- For each patient a detailed medical history, BMI, PVR and a 3 days-FVC were collected.
- BC have been calculated as the sum between micturition volume and PVR
- Patients with a PVR > 50 ml were excluded. Frequency (24 hours, day-time, night-time), mean/minimum/maximum BC (24 hours, day-time, night-time), total voided volume (24 hours, day-time, night-time), Nocturia index (Ni) and Nocturnal Polyuria index (NPI) were assessed.
- Nocturnal Polyuria (NP) was defined according the criteria of NP₂₀₋₃₃
- Reduced BC was defined as a mean 24 hours BC < 200 ml.
- Severe nocturia was defined as ≥ 3 episodes par night.
- Patients were categorised in 4 subgroups according the presence/absence of NP and reduced BC.
- We have classified nocturia severity according the number of voids/night: mild/moderate nocturia: 1-2 episodes/night; severe nocturia: > 2 episodes/night
- Multivariate logistic regression analysis was used to determine covariates associated with NP and reduced BC.

Results

| | Mean BC (day-time) (mL) | Mean BC (night-time) (mL) | p | Maximum BC (day-time) (mL) | Maximum BC (night-time) (mL) | p | Mean Nocturia Episodes | Nocturnal voided volume (NVV) (mL) |
|--|---------------------------------|-----------------------------------|-------|---------------------------------|-----------------------------------|-------|------------------------------|------------------------------------|
| Pts with reduced BC and with NP (31/84; 37%) | 124.2 \pm 63.6 (122; 80/142) | 149.9 \pm 73.5 (135; 96/184) | 0.027 | 227.5 \pm 85.9 (204; 170/280) | 239.7 \pm 97.7 (230; 155.0/300) | 0.289 | 3.2 \pm 1.6 (3.0; 2.0/4.0) | 503.9 \pm 271.3 (430; 340/550) |
| Pts with reduced BC and without NP (19/84; 22.5%) | 153.8 \pm 33.5 (150; 126/190) | 178.8 \pm 88.2 (160; 105./277) | 0.647 | 257.8 \pm 71.1 (240; 200/300) | 259.5 \pm 121 (200; 200/300) | 0.669 | 1.8 \pm 1.3 (2.0; 1.0/3.3) | 328.2 \pm 122.6 (300; 277/405) |
| Pts with normal BC and with NP (19/84; 22.5%) | 243.1 \pm 76.3 (240; 172/275) | 294.11 \pm 107.3 (311; 260/345) | 0.033 | 346.0 \pm 71.1 (240; 200/300) | 419.2 \pm 194 (400; 295/500) | 0.016 | 2.0 \pm 0.9 (2.3; 1.0/3.0) | 745.1 \pm 234.4 (766; 563/860) |
| Pts with normal BC and without NP (15/84; 18%) | 239.2 \pm 68.7 (210; 201/260) | 261.2 \pm 160.2 (215; 176/290) | 0.733 | 333.0 \pm 106 (300; 270/400) | 348.7 \pm 208 (280; 210/400) | 0.972 | 1.4 \pm 1.0 (2.0; 1/2.3) | 522.4 \pm 171.8 (501; 380/640) |

Table 1: Variations in mean/maximum bladder capacity in different patients' subgroups

| | OR | 95% IC | p |
|--|-------|--------------|-------|
| BMI (m/kg²) | 1.283 | 1.043-1.579 | 0.019 |
| Age(yearsi) | 0.950 | 0.911-0.990 | 0.015 |
| Reduced BC | 0.965 | 0.349-2.667 | 0.945 |
| Mild/Moderate nicturia (1-2 episodes/night) | 2.258 | 0.690-7.392 | 0.178 |
| Severe Nicturia (> 2 episodes/night) | 6.256 | 1.707-22.922 | 0.006 |

Table 2: Risk Factors for NP

| | OR | 95% IC | p |
|--|-------|--------------|-------|
| BMI (m/kg²) | 1.046 | 0.869-1.261 | 0.634 |
| Age(yearsi) | 1.008 | 0.972-1.045 | 0.674 |
| NP | 0.847 | 0.514-2.511 | 0.851 |
| Mild/Moderate nicturia (1-2 episodes/night) | 1.171 | 0.690-7.392 | 0.778 |
| Severe Nicturia (> 2 episodes/night) | 3.773 | 1.203-11.833 | 0.023 |

Table 3: Risk Factors for reduced BC

Conclusion

- The mismatch between BC and NVV has a key role in the pathophysiology of the nocturia and NP.
- Patients with NP presented a different BC between day-time and night-time.
- Severe nocturia (≥ 3 episodes/night) predicts the presence of NP and a reduced BC.
- In patients with severe nocturia both conditions should be considered and managed.