

NEUROGENIC BLADDER IN CHILDREN FOLLOWING SPINAL CORD ISCHEMIA

Hypothesis / aims of study

Spinal cord ischemia is a well recognized cause of paraplegia and neurogenic bladder in adults after thoracic aortic surgery. In children, this entity is rare and may occur after various procedures, such as umbilical artery catheterization or cardiac defects repair, or after spontaneous bleeding of a spinal artery arteriovenous fistula.

In the literature, urological assessment of these paediatric patients is limited.

The aim of the study was to analyze the occurrence of neurogenic bladder following spinal cord ischemia after cardiac surgery in paediatric patients, focusing on urodynamic findings, treatment and outcome.

Study design, materials and methods

Between 1993 and 2000, 3 girls, aged 2 months to 36 months (average: 14,5 months) presented with neurogenic bladder related to spinal cord ischemia. Cardiac surgery was done in all the three patients as follow: ligation of patent ductus arteriosus and interventricular septal defects closure (patient 1), atrioventricular canal correction (patient 2) and aortic coarctation repair in the presence of an anomalous right subclavian artery (patient 3). All patients were evaluated for neurological and urological status using spinal cord magnetic resonance imaging (MRI), urodynamic study and renal ultrasound.

Results

In all the three patients urinary retention was the common urological symptom occurred, as well as the neurological assessment demonstrated a lower limb flaccid palsy in all children. Renal function remained stable in two patients (Patient 2 and Patient 3), while patient 1 presented acute renal failure immediately after surgery. In only one case (Patient 3), bilateral hydronephrosis, was noticed and surgical procedure was performed. MRI performed postoperatively at a mean time of 5.6 days (range 1-15 days), demonstrated an ischemic lesion of conus medullaris in patient 1, an ischemic involvement of lower thoracic cord and conus medullaris in patient 2 and a normal findings in patient 3.

At the first urodynamic control patient 1 had neurogenic detrusor overactivity bladder with sphincter dyssynergia while, at the follow-up, a lower motor neuron lesion with detrusor areflexia and sphincter dyssynergia. Patient 2 and patient 3 presented respectively a lower and an upper motor neuron lesion. Treatment consisted of clean intermittent catheterization (CIC) and oxybutinine in patient 1 and 2 and only CIC in one, resulting in complete continence without upper urinary tract deterioration.

Interpretation of results

Paraplegia and lower urinary tract dysfunction is a possible complication of the cardiovascular surgery. An early postoperative MRI could not demonstrate the ischemic lesion. The urodynamic pattern changed during the follow-up in one case.

Concluding message

In children, spinal cord damage causing paraplegia and lower urinary tract dysfunction is a rare but well established complication after cardiovascular surgery. Some causes, as prolonged intraoperative ischemia are widely recognized, in others it is more difficult to explain. The presence of anomalous vascular supply of the spinal cord must be ruled out.

All patients with lower urinary tract dysfunction after cardiac surgery should be serially investigated to detect neurogenic bladder dysfunction in a timely fashion to avoid upper urinary tract deterioration with a prompt and appropriate therapy. The follow-up of these patients using MRI and urodynamics study is recommended because the neurogenic lesions could be better detected over time.