Paraplegia Following Elective Repair Of An Infra-Renal Aortic Aneurysm: A Case Report

I Mallick

Citation

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Abstract

Paraplegia occurring as a complication of repair of thoracic/thoracoabdominal aortic aneurysmal repair is well documented. This devastating complication occurring in abdominal aortic aneurysmal (AAA) repair is very rare. The incidence occurring in elective repair is about 0.1-0.2%. We report a case of paraplegia that occurred following a repair of an infra-renal AAA.

CASE REPORT

A 68-year-old was seen in the outpatient with a symptomatic AAA. Ultrasound scanning showed a 6.9cm infra-renal AAA with involvement of the right external iliac and bilateral femoral aneurysms. He was fit and well with a stable cardio-respiratory status. He had an elective aneurysmal repair under general anaesthesia. Aorta and groin vessels were dissected and controlled; Heparin infusion (5000 units IV) was given. Aorto-bifemoral graft was sutured in place. The operating time was 3 hours and 15 minutes and the aorta cross-clamping time was 1hr and 45 minutes. There was no significant hypotension during the operative procedure. Patient had an epidural catheter for analgesia.

On the first post operative day he developed flaccid paraplegia and became incontinent of urine and faeces. The paralysis was affecting the distal group more than the proximal group of muscles. Deep tendon reflexes were absent and plantars were equivocal. Sensation was diminished from L4 to S1. The patient's distal vascular examination remained unchanged with palpable femoral, dorsalis pedis and posterior tibial artery. Initially we suspected the paresis was due to the effects of epidural and discontinued it. Magnetic Resonance Imaging (MRI) scan ruled out any cord lesions in terms of compressing lesions or infarction. There was no improvement in the following days, so we re-vascularised his Left internal iliac artery. Electro-myographic studies (EMG) suggested that there was axonal degenerative lesion of the peripheral motor & sensory nerves destined to the lower limbs with the sciatic nerve being more affected than the obturator nerves, and common peroneal nerve being more affected than the tibial nerves. These findings ruled out the possibility of any cord lesion and suggested acute compressive axonotmetic lesion affecting the lumbo-sacral plexus. A subsequent MRI scan ruled out any compressive lesion in the pelvis.

The patient had intense physiotherapy, and he is making a slow but a steady progress. He is continent nowadays and he is mobilising at home with the help of a frame.

DISCUSSION

Paraplegia following repair of infra-renal AAA repair is very rare when compared to the thoracic/thoraco-abdominal repair. Isolated cases have been reported in the literature. Incidence ranges from 1.4% to 2.0% for emergency repair and 0.1% to 0.2% for elective repair [1,2] . The onset of this complication is usually immediate but recognition may be delayed due to the patient being ventilated or due to effects of epidural analgesia.

A brief mention of blood supply of the spinal cord is essential for better understanding of the pathophysiology of this complication. Three spinal arteries namely one anterior and a pair of posterior spinal arteries from the vertebral arteries supply the cord. The anterior spinal artery is the principal artery of the three, supplying the anterior two-thirds of the cord, including the critical motor area [3]. Segmental arteries from subclavian, intercostal, upper lumbar and branches from the internal iliac and middle sacral arteries regularly feed the anterior spinal artery. The largest of these segmental arteries is called the great radicular artery of Adamkiewicz or arteria radicularis magna (ARM) which originates as a branch usually from a left

intercostal artery between T9 and T12 in 75% of patients, T5 and T8 in 15%, and L1 and L2 in 10% [4]. Operative interference of this artery is implicated as one of the cause of paraplegia in thoraco-abdominal repair. Inferior mesenteric artery and branches of the profunda- femoris join the hypogastric artery and its branches to form the pelvic circulation. The pelvic circulation supplies some of the distal spinal cord. At present we do not possess the angiographic technique to visualise the entire cord supply in any individual patient, our ability to completely avoid neurological complications during aortic operations are hindered.

Gloviczki [2] et al classified ischaemic injuries to the spinal cord and lumbosacral roots or plexus based on the location and extent (Table 1).

Figure 1

Table 1: Shows the classification of ischaemic injuries to the spinal cord and lumbosacral roots or plexus.

Classification	Site of ischaemia	Neurologic deficit
I	Distal thoraco-lumbar cord	Bilateral flaccid paraplegia and sensory loss. Bowel & Bladder dysfunction.
II	Anterior two thirds of the spinal cord (Ant. Spinal artery syndrome)	Bilateral flaccid paraplegia and loss of pain, temperature sensation; proprioception & vibratory sensation maintained.
III	Lumbosacral roots with/without patchy infarcts of cord	Bilateral asymmetric paraparesis with or without bowel and bladder incontinence.
IV	Lumbosacral plexus	Bilateral asymmetric paraparesis with or without bowel and bladder incontinence. Preservation of paraspinal muscle innervation on EMG.
V	Segmental infarction of spinal cord	Bilateral spastic paraplegia with sensory loss
VI	Posterior third of spinal cord (posterior spinal artery syndrome)	Loss of proprioception & Vibratory sensation

Interference with pelvic blood supply, prolonged aortic cross-clamping, prolonged supra-renal clamping, intra-operative hypotension, thromboembolic phenomenon and interference to a low origin of the ARM have all been suggested as possible causes of spinal cord ischaemia [5].But none of the factors have been identified as the sole cause for this phenomenon.

MRI should be done to rule out a compressive lesion, as this is potentially curable. EMG studies point towards the exact site of the lesion. This will help to predict the outcome. Patients with an ischaemic injury to the lumbo-sacral roots or plexus have a better recovery.

Prevention remains the mainstay, which includes gentle operative technique to prevent embolisation, maintenance of intra-operative haemodynamics, systemic heparinisation, avoidance of prolonged supraceliac cross clamping and understanding and preservation of the pelvic collaterals [5] .

In our case interruption of the collateral flow via the branches of the internal iliac arteries seemed to have caused the axonal level of injury to the lumbosacral plexus.

CORRESPONDENCE TO

Mr Ismail H Mallick,Clinical Research Fellow, University Department of Surgery, Royal Free Hospital, Hampstead , London NW3 2QG, England. Email : imallick@excite.com

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Author Information

Ismail H. Mallick, MSc (Lon) , MRCS
Clinical Research Fellow, University Department of Surgery, Royal Free Hospital