

Giant schwannoma of the lumbar spine. A case report

Olbrzymi nerwiak osłonkowy odcinka lędźwiowego kręgosłupa. Opis przypadku

Roman Jankowski¹, Jacek Szmeja², Stanisław Nowak¹, Bartosz Sokół¹, Tomasz Błok¹

¹Department of Neurosurgery and Neurotraumatology, University of Medical Sciences, Poznań

²Chair and Department of General, Gastroenterological and Endocrinological Surgery, University of Medical Sciences, Poznań

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Abstract

Giant “invasive” schwannomas of the spine occur occasionally, most frequently in the lumbar region. We present the case of a 46-year-old woman with giant “invasive” schwannoma of the lumbar spine, with a 12-year history of illness. The tumour originated in the vertebral canal and passed through the paraspinal muscles and retroperitoneal area to the abdominal cavity. The part of the tumour which was in the abdominal cavity was removed by means of laparotomy during the first operation. In the second one, the remaining part of the tumour was removed completely from the vertebral canal and retroperitoneal area through posterior-lateral access. The spine was stabilized with metal implants. Histological examination revealed cellular schwannoma. During the follow-up the pain resolved while paresis of the right quadriceps muscle of the thigh was still present. Cellular schwannoma is a benign form of schwannoma, but it may cause a local recurrence if not removed completely.

Key words: “invasive” giant schwannoma, spine, surgical treatment.

Streszczenie

Olbrzymie „inwazyjne” nerwiaki osłonkowe kręgosłupa występują sporadycznie, najczęściej w odcinku lędźwiowym. W pracy przedstawiono przypadek 46-letniej chorej z olbrzymim „inwazyjnym” nerwiakiem osłonkowym odcinka lędźwiowego kręgosłupa, z 12-letnim wywiadem chorobowym. Guz wychodził z kanału kręgowego, a poprzez mięśnie przykręgosłupowe i okolicę zaotrzewnową przechodził do jamy brzusznej. Podczas pierwszej operacji drogą laparotomii usunięto część guza znajdującego się w jamie brzusznej. W drugim etapie, z dojścia tylnobocznego, usunięto doszczętnie pozostałą część guza z kanału kręgowego, przestrzeni zaotrzewnowej i dokonano stabilizacji kręgosłupa implantami metalowymi. Badanie histologiczne wykazało nerwiak osłonkowy komórkowy.

W okresie obserwacji u chorej ustąpił ból, nadal utrzymuje się niedowład prawego mięśnia czworogłowego uda. Nerwiak komórkowy jest łagodną postacią nerwiaka osłonkowego, może być jednak przyczyną miejscowej wznowy, jeżeli nie zostanie całkowicie usunięty.

Słowa kluczowe: „inwazyjny” olbrzymi nerwiak osłonkowy, kręgosłup, leczenie operacyjne.

Correspondence address: dr hab. Roman Jankowski, Katedra i Klinika Neurochirurgii i Neurotraumatologii, Uniwersytet Medyczny im. Karola Marcinkowskiego w Poznaniu, ul. Przybyszewskiego 49, 60-355 Poznań, e-mail: klinikanch@op.pl

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Introduction

Schwannomas constitute 25% of spinal neoplasms which undergo surgical treatment [1-3]. The term “giant spinal schwannoma” relates to tumours destroying bone structures of vertebrae passing outside the spine to the paraspinal region [3-5]. The aim of this article is to present the case of a patient with

surgically treated giant “invasive” schwannoma of the lumbar spine.

Case report

A 42-year-old female was admitted to our department with a 12-year history of low back pain. She also complained of right-sided sciatica which had appeared a couple of months prior to admission to the hospital. On examination she presented with tenderness of the right subcostal area and palpable resistance in this area was found during the abdominal examination; she had positive Laseque sign on both sides (left 20°, right 40°). She was initially diagnosed with renal tumour which was confirmed in ultrasound examination. Computed tomography (CT) of the abdomen revealed a giant tumour of the lumbar spine (Fig. 1). X-ray images of the spine in anteroposterior and lateral views revealed deformity of the spinal axis, destruction of the vertebral body and right vertebral pedicle of L2, widening of the vertebral canal dimension in the frontal and median plane, as well as destruction of interfacet joints L1-L2 and L2-L3 on the right. Urography showed normal renal contrast excretion, dislocation of the right renal pelvis and right ureter to the left side. The right ureter was slightly stenosed at the level where the tumour was located. Magnetic resonance imaging (MRI) confirmed the presence of a large, solid cystic tumour spreading throughout the vertebral body, vertebral pedicle and vertebral arch of L2 on its right side and pressing against nerve roots of the cauda equina. The extraspinal mass of the tumour spread throughout the iliopsoas muscle, extending to the retroperitoneal space with dislocation of the right kidney to the left upper front side (Fig. 2).

In the first stage, a laparotomy was performed. The tumour penetrated from the right side of the retroperitoneal space and was dislocating the kidney. The right ureter, renal artery and vein connected with the tumour capsule were isolated retroperitoneally. After relocating the tumour to the right side, the aorta with lumbar segmental arteries and vena cava inferiorly with lumbar veins were exposed. Vessels vascularizing the tumour were ligated and cut. The tumour was separated from the vertebral body of L2. After the operation, the patient's main complaint was severe pain in the front surface of the right thigh. Neurological examination showed paresis of the right quadriceps muscle (grade III on Lovett scale) and decreased light touch sensation



Fig. 1. CT examination reveals abdominal tumour destroying L2 vertebra



Fig. 2. MR examination shows the intraspinal tumour and paraspinal tumour mass located in the iliopsoas muscle, retroperitoneal space and abdominal cavity

on the frontal and lateral surface of the right thigh. Histological examination showed a pattern of densely cellular schwannoma of grade II biological malignancy according to WHO. The CT examination confirmed complete removal of the abdominal part of the tumour (Fig. 3).

The second operation was performed 4 weeks later, by a posterior-lateral approach, which included laminectomy of L2 and partial L3 laminectomy, facetectomy of L1-L2, L2-L3, and pediculotomy of L2 on the right side. The access was enlarged by cutting paraspinal muscles on the right side. After decompression of nerve elements in the vertebral canal, the tumour mass was exposed in paraspinal muscles from where it penetrated towards the lumbosacral plexus. The tumour was completely macroscopically removed. In order to achieve stabilisation of the spine, a titanium cylinder was implanted in the space between the L1 and L3 vertebral bodies. The spine was additionally immobilized with a transpedicular stabilisation system, where transpedicular screws were located in the vertebral pedicles and vertebral body of L1 and L3 (Fig. 4).

Postoperatively the pain disappeared but the impairment of muscular strength in the right quadriceps muscle persisted (grade III on Lovett scale). The



Fig. 3. Postoperative CT scan of the spine and abdominal cavity reveals total resection of the abdominal part of the tumour

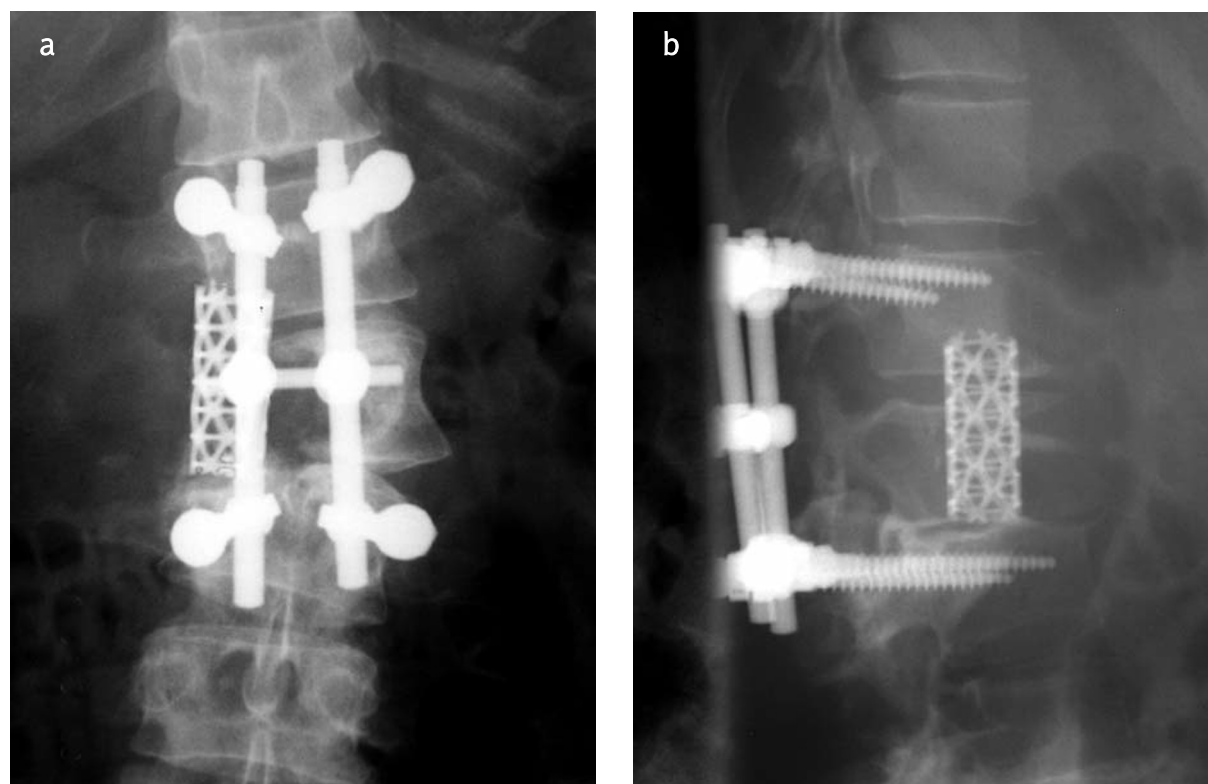


Fig. 4. Anteroposterior (a) and lateral (b) X-rays of the spine demonstrate titanium cylinder implanted between L1-L3 bodies and stabilisation with transpedicular screws

patient was discharged on the tenth day after the operation. Since then, she has been followed up in the outpatient clinic, reporting pain in the lumbosacral region and some improvement of right leg weakness.

Discussion

Schwannomas can be diagnosed in patients of all age groups, predominantly in young and middle aged patients, irrespectively of sex [6]. Generally, these tumours grow slowly for many years. Tumours reach the dimension of a dozen or so centimetres. The main clinical symptom is increasing pain, without periods of remission, aggravated by lying down and especially during the night. Symptoms of dysaesthesia, debilitation of muscle strength and autonomic dysfunction appear as the disease develops [1,7]. Retroperitoneal tumour growth leads to abdominal pain and weight loss. Cauda equina compression causes pain, dysaesthesia and paraparesis. Some atypical signs can be observed, including headaches, renal colic, and haematuria. Correct diagnosis can be reached after a long period of time due to slow tumour growth [8,9].

Local osseous changes caused by growth of the schwannoma are visible in X-ray, CT and MR examinations [1,10]. These changes include: destruction of the vertebral pedicle, dilation of the vertebral canal, changes in the vertebral body (posterior scalloping), and increase of the distance between vertebral pedicles. Schwannomas cause pressure erosion in adjacent bone structures. Tumour expansion to the vertebral body may also be caused by the schwannoma spreading along the ramus of the spinal nerve [6]. Our patient had extensive osseous changes which consisted of increase of interpedicle distance, erosion of the vertebral body, thinning of the vertebral arch, destruction of articular processes and dilation of the intervertebral foramen. Extensive destruction of bones allowed the neoplasm to get into the paraspinal muscles and retroperitoneal area.

Giant schwannomas can mimic malignant neoplasms, especially when spine destruction is visible on X-rays.

CT and MRI scans can help to establish the diagnosis. Compression of neural structures, displacement of internal organs, and blood flow disturbances in arterial and venous vessels of the retroperitoneal cavity can be revealed. Most of the tumour can be located in the retroperitoneal space or abdominal cavity, resulting in descending aorta, inferior vena cava and ureter

displacement. Preoperative imaging of these structures is mandatory. It is sometimes difficult to differentiate the vena cava wall from the tumour capsule, especially when it is stretched on the tumour [1,3,8,9,11].

It is necessary to use autogenous or freeze-dried bone allograft and metal implants to maintain spine stability. There are plenty of stabilization systems in use, depending on the range of spinal destruction. Metal implants can cause CT and MRI artefacts which influence our ability to recognize tumour recurrence [11,12].

According to Sridhar *et al.* [3] the presented tumour could be classified as grade 5, which is called a “giant invasive schwannoma” due to destruction of bone structures as well as infiltrative expansion. Giant “invasive” schwannomas are found almost exclusively in the lumbosacral spine; however, there are single cases in the thoracic and cervical spine [11,13].

Problems related to the operative treatment of giant lumbosacral schwannomas with bony destruction are discussed in some casuistic reports [6,14-16]. Bhatia reported 10 cases treated surgically due to giant lumbosacral schwannomas [1]. A literature review from 1988 to 2007 done by Chiang *et al.* [8] revealed 51 giant schwannomas with vertebrae destruction. Tumours most often occupied the lower cervical spine (19 cases) and lumbar one (22 cases). Rarely they were observed in the sacral region (16 cases) and sporadically in the thoracic spine (1 case). Kagaya *et al.* [12] in his literature review analyzed 35 cases of giant cauda equina schwannomas. Nine of them were located in the lumbar region and the remainder were found in the lumbosacral border and sacral spine. Difficulties in operative treatment of giant invasive schwannomas are associated mainly with radical removal of the extraspinal part of the tumour and maintenance of spinal stability. Radical removal of the tumour is sometimes impossible due to unclear plane of cleavage [1,3,4,11,17,18].

The issue of diagnostic scheme and operative treatment of giant lumbar spine schwannomas is still open. Different approaches and stabilization techniques are used without clear guidelines [1,3,4,12].

Conclusions

“Invasive” giant schwannoma is rare and usually occurs in the sacrolumbar spine. In the case of giant schwannoma infiltrating the abdominal cavity operative treatment is complex and usually two-staged. The aim of the operation is complete removal of the tumour,

release of neuronal and vascular structures, and maintenance of spinal stability.

Cellular schwannoma is a benign form of schwannoma, but it may cause a local recurrence if not removed completely.

Disclosure

Authors report no conflict of interest.

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