Case Report

Journal of INTERNATIONAL MEDICAL RESEARCH

Journal of International Medical Research
2019, Vol. 47(9) 4568–4574

DOI: 10.1177/0300060519866270
journals.sagepub.com/home/imr
SAGE

Bacteroides fragilis sacral spondylodiscitis and epidural abscess after sacrocolpopexy: a case report and literature review

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Abstract

Spondylodiscitis with or without epidural abscess is a rare, although serious, complication after sacrocolpopexy. We present a case of an 81-year-old patient who developed anaerobic *Bacteroides fragilis* sacral spondylodiscitis with epidural abscess 18 weeks after laparoscopic sacrocolpopexy. Because of the patient's old age, comorbidities, and further complications during hospitalization, she was treated conservatively with an early switch to oral antimicrobial therapy with good oral bioavailability. Because of retention of titanium bone anchors in the first sacral vertebra, oral antimicrobial treatment with biofilm-active clindamycin was prolonged to 6 months. This conservative approach was successful. One year after discontinuation of antimicrobial therapy, the patient had no signs of recurrence of infection or other complications. With retention of implanted material, we preserved good pelvic support with a good effect on the patient's quality of life. A combined surgical and antimicrobial therapy with mesh removal is the treatment of choice in most cases of spinal infectious complications. However, we would like to emphasize the need for an individualized therapeutic approach in the growing population of frail and polymorbid, older patients, where a conservative approach can have important effects on the quality of life. Infectious complications can have devastating consequences in these patients.

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Keywords
Anaerobic spondylodiscitis, epidural abscess, laparoscopic sacrocolpopexy, *Bacteroides fragilis*, implant-related infection, older patient

Date received: 21 February 2019; accepted: 8 July 2019

Introduction

Spinal epidural abscesses are rare, although their incidence has increased in the last decades[1] because of the aging population, instrumentation of the spine, and better diagnostics. The most common mechanism of spinal epidural abscesses is by haematogenous seeding in 50% of patients. However, bacteria can enter the epidural space per continuitatem from neighbouring infection (most commonly spondylodiscitis) or by iatrogenic means (15% of all spinal epidural abscess cases) during instrumentation of the spine.[2] Spinal infection after abdominal or laparoscopic sacrocolpopexy is a rare complication.[3–7] The most common causative pathogen in spinal epidural abscess overall is *Staphylococcus aureus* (60%), whereas anaerobic microorganisms are only rarely found (2%).[8,9] *Bacteroides* spp are anaerobic, non-spore-forming, Gram-negative rods with a tendency of abscess formation. *Bacteroides* spp are normal gut commensals and can cause different infections in the abdomen and female genital tract. There have only been a few reports in the literature of *Bacteroides fragilis* spondylodiscitis or spinal epidural abscess,[2,8–10] related to extension of inflammation from an intraabdominal inflammatory focus, and one of them occurred after gynaecological curettage for abortion.[11] A review by Propst et al.[4] found five cases of *B. fragilis* spondylodiscitis, and four of them were after abdominal sacrocolpopexy. There is also one report of *B. fragilis* spondylodiscitis after robotic-assisted sacropolopopexy.[5]

Case report

We present a case of an 81-year-old woman who was first admitted to the Department of Infectious Diseases at the University Clinical Centre Maribor 18 weeks after the surgical procedure of laparoscopic sacrocolpopexy. This case report represents the course of her illness during the next 18 months. The patient was admitted on 8 August 2016 because of general malaise, elevated inflammatory markers, and progressive lumbosacral pain that started 1 week before admission. She denied having fever or chills. She also denied any trauma or falls in the past. She had a history of arterial hypertension and ischaemic heart disease. She had undergone vaginal hysterectomy 1 year previously and laparoscopic sacrocolpopexy due to vaginal prolapse 18 weeks before this admission. Both surgeries were uneventful, and the patient did not have any complaints in the pelvic or genital area thereafter.

On admission, the patient was afebrile and stabile, with lumbosacral pain radiating into the right leg that was aggravated by walking. She presented with positive Lassegue's sign of 50° in her right leg in a physical examination, with normal muscle strength in both legs. No faecal or urinary incontinence or other neurological deficits were observed. Slight tenderness on lumbosacral spine percussion was present, but without paraspinal muscular spasms. No other foci of infection were detected in the clinical examination. Her total leukocyte count was 17,700/mm^3, C-reactive protein (CRP) level was 207 mg/L, erythrocyte

sedimentation rate (ESR) was 99 mm/hour, and procalcitonin level was 7.8 ng/mL. A urinalysis test was normal and no vaginal discharge was observed. An urgent computed tomography (CT) scan of the thoracolumbar and lumbosacral spine was performed on admission, which showed age-related degenerative changes without other significant pathology.

Spondylodiscitis was suspected because of elevated inflammatory markers and lumbar pain. Antimicrobial therapy with amoxicillin/clavulanic acid 1.2 g four times a day and intravenous analgesic therapy were started immediately after withdrawal of blood for culture. Magnetic resonance imaging (MRI) of the lumbosacral spine on the 4th day of hospitalization (12 August 2016) showed soft tissue swelling and oedema around the titanium bone anchors in the first sacral vertebra and minimal fluid collection in the intervertebral disc at the L5–S1 levels. Additionally, axial images at the L4 level showed fluid collection in the spinal canal with rim enhancement, which indicated spondylodiscitis with paraspinal phlegmon and a small epidural abscess. However, MRI showed no major compression on neural elements. On the same day (4th day of hospitalization), *B. fragilis* grew in blood cultures and we switched to targeted antimicrobial treatment with metronidazole 400 mg three times a day (t.i.d.) and added ceftriaxone 2 g daily intravenously. A neurosurgeon was consulted immediately and a decision against urgent surgical intervention was made at that time because of the absence of neurological deficits, the patient's comorbidities, and known aetiology (positive blood cultures). According to MRI, an association of sacral spondylodiscitis and epidural abscess with remote laparoscopic sacrocolpopexy was suggested, where three titanium bone anchors for mesh attachment over the sacral promontory were inserted. A gynaecological examination, and gynaecological and abdominal ultrasound were performed without pathological findings. The mesh was firm with normal pelvic support after the gynaecological procedure (Pelvic Organ Prolapse Quantification stage was −2, −2, −9, 3.5, 3.5, 11, −3, −3, −).

Because of the aggravating lumbar pain and persistently elevated inflammatory markers, a control MRI was performed on the 8th day of hospitalization (16 August 2016). This MRI showed a similar size of the abscess, but initial infection in the disc space was even larger and it had spread to the adjacent vertebral body endplates (Figure 1a). Deterioration of the lumbar pain, despite the lack of clinical neurological deficits, forced the decision for neurosurgical intervention with planned collection of tissue samples for microbiological analysis. Unfortunately, on the same day of the planned surgery, the patient suffered from dyspnoea and chest pain (22 August 2016). Pulmonary embolism and acute myocardial ischaemia were diagnosed and surgery was postponed for a few days. During this time, the lumbar pain started to improve. Because of the high perioperative risk, we continued with conservative treatment, although tissue samples for microbiological analysis were not obtained. On the 3rd week of hospitalization, her condition had greatly improved, and inflammatory markers were decreased (ESR: 56 mm/hour, CRP level: 40 mg/L). We switched to oral treatment with metronidazole 500 t.i.d. and ciprofloxacin 500 mg twice daily, and the patient was released home (6 September 2016). A few days later (14 September 2016), she returned to the hospital because of nausea and vomiting, which were probably caused by the oral form of metronidazole. She still complained of lumbar pain and required oral analgesic therapy, but was able to walk with an assistance device. We changed the antimicrobial therapy according to susceptibility testing of *B. fragilis* to monotherapy with

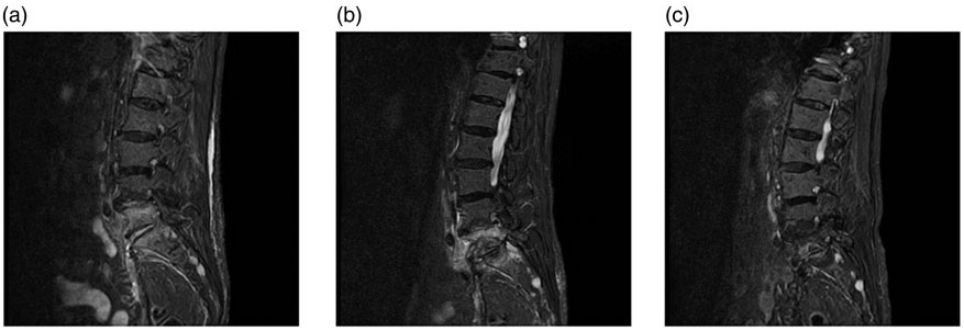

Figure 1. (a) Magnetic resonance imaging (sagittal plane, short-term inversion recovery sequence) on the 8th day shows ventral soft tissue oedema and disc inflammation at the L5–S1 levels with bone oedema of the two adjacent vertebral bodies. (b) Control magnetic resonance imaging after 1 month shows L5 and S1 endplate impression and progression of inflammation. (c) Magnetic resonance imaging 1 year later shows resolution of the inflammation. The paravertebral soft tissues are without signs of inflammation. The vertebral body L5 is structurally changed with focal impression of the inferior terminal endplate. There are no signs of fluid collection or phlegmonous soft tissue.

clindamycin 900 mg t.i.d. intravenously. The oral form of clindamycin 450 mg t.i.d. was continued a few days later after resolution of vomiting. A control MRI of the spine was performed during this time (1 month after the beginning of antimicrobial therapy; 21 September 2016), where progression of inflammation in the vertebra was observed (Figure 1b). The patient's clinical condition further improved and she was discharged home on oral therapy. Because of the remaining titanium anchors in the sacral vertebra, we decided to prolong the oral antimicrobial therapy with clindamycin 450 mg t.i.d. to 6 months.

At the patient's regular follow-up visits in the following months, her condition slowly improved further. We discontinued the antimicrobial therapy after 6 months (1 March 2017) when her condition was stable and inflammatory markers remained low (ESR: 40 mm/hour, CRP level: 10 mg/L). The spinal pain gradually subsided and she was able to perform most activities of daily living. At a follow-up visit 1 year after discontinuation of the antimicrobial therapy (March 2018), she was well, without any signs of recurrence of the infection or other complications, and she was able to walk without assistance. A control MRI of the lumbar spine was performed during this visit and it showed resolution of the epidural abscess without any active site of infection in the vertebra (Figure 1c).

The patient signed written informed consent agreeing to publication of this manuscript and any accompanying images and medical data.

Discussion

We present a case of iatrogenic anaerobic spinal epidural abscess with sacral spondylodiscitis caused by direct extension of bacteria through anchoring material in the sacrum 18 weeks after laparoscopic sacrocolpopexy. Spondylodiscitis with or without an epidural abscess is a rare complication of sacrocolpopexy.[3,4,6] In one study, spondylodiscitis was found postoperatively in 5.6% of patients after laparoscopic sacrocolpopexy with concomitant rectopexy and in 0% of patients after laparoscopic sacrocolpopexy without rectopexy.[5] Some authors have even suggested that the graft rejection process could be an initiator or promotor of the

inflammatory process in sacral bone after this procedure.[12] Combined surgical and antimicrobial therapy is the treatment of choice in most cases of spinal epidural abscess. A similar approach is recommended for treating sacral spondylodiscitis after sacrocolpopexy where a surgical procedure with debridement and complete removal of mesh supporting the vagina[13–19] and targeted antimicrobial therapy is most common recommended treatment. There have been only a few reports of successful conservative treatment with mesh retention.[20–22]

The findings in our case show successful conservative treatment of sacral spondylodiscitis with spinal epidural abscess without removal of mesh in a frail, older patient. Unfortunately, we were not able to perform a biopsy of inflamed vertebral tissue/abscess for microbiological analysis. Positive blood cultures are considered diagnostic only in case of *S. aureus*, *S. lugdunensis,* and *Brucella* spp vertebral osteomyelitis.[23] Therefore, we were aware of a possible polymicrobial infection because of the mechanism of infection and because the majority of reported cases of sacral spondylodiscitis were polymicrobial.[4] However, the clinical course was favourable in our patient with prolonged antimicrobial therapy.

Eradication of infection related to foreign implanted material usually requires removal of the material because bacterial biofilm created on the surface of the material makes eradication of the infection difficult. In case of retention of the implanted material, choosing an active antimicrobial agent for the biofilm is crucial. Metronidazole and clindamycin both have good biofilm activity, as well as excellent bioavailability, which enables a faster switch to oral treatment.[24,25] Our patient received 3 weeks of parenteral treatment. We switched to oral treatment thereafter, whereas most authors recommend 6 to 8 weeks of parenteral treatment in case of vertebral spondylodiscitis.[23] In our opinion, this parenteral treatment is not mandatory when antimicrobial therapy with good oral bioavailability can be chosen and the patient is stable and able to tolerate oral treatment. This is similarly recommended by Babouee Flury et al.[26] for primary bacterial osteomyelitis in patients without abscesses. A rapid switch to oral treatment enabled our patient to return to the home environment earlier. Conservative treatment without an additional surgical procedure and mesh retention, as well as a shorter hospital stay, had an important effect on the patient's quality of life. The patient did not have any side effects of the prolonged antimicrobial treatment with clindamycin and was adherent to the treatment.

There have not been many studies concerning the duration of antimicrobial treatment in case of foreign material retention.[27] Compared with other implant-related infection, such as prosthetic joint infection, some authors recommend long or even life-long suppressive therapy in case of conservative treatment with infected implant retention. We decided to prolong the antimicrobial treatment to 6 months with an excellent outcome in our patient.

We present successful conservative treatment of *B. fragilis* spondylodiscitis with spinal epidural abscess after remote laparoscopic sacrocolpopexy in a frail, older patient. Our findings emphasize the need for an individualized approach in polymorbid patients. Physicians should also be aware that even minimal invasive procedures can have serious complications many months or years later, which can be devastating, especially in frail, older patients.

List of abbreviations

CRP – C-reactive protein
ESR – erythrocyte sedimentation rate
CT – computed tomography
MRI – magnetic resonance imaging
t.i.d. – three times a day

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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