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Case report

Surgical treatment of spondylitis and diaphragm relaxation in patient less than 1 year old

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ABSTRACT

Design: Case report.
Introduction: The combination of severe post-infectious kyphosis and diaphragm relaxation is extremely rare in patient early than 1 year old. Its no publications concerning their simultaneous surgical treatment.
Case description: 7-Month-old girl had simultaneous spinal reconstruction with anterior and posterior instrumentation and plastic of diaphragm because of sequelae of non-granulenatous spondylitis complicated by severe kyphosis (54°) and diaphragm relaxation. Between 1.5 and 3 months of live she had several infections incl. pneumonia, enterocolitis, ENT infection. Anterior fusion was done by titanium mesh with auto-rib, posterior – by compressive rods based on low-profile hooks. The deformity was reduced till 20°. 2.5 years after initial surgery and 1 year after removal of posterior instrumentation the adequate level of diaphragm and minimal (4°) loss of kyphosis correction were identified.
Conclusions: The combination of spondylitis and diaphragm relaxation in early aged patient could be explained but it could not be confirmed as a sequelae of late-onset neonatal sepsis with a multi-focal lesions. The simultaneous surgery provided on the combined approaches (trans-thoracic and posterior) looks as optimal options in such combination of pathologies. In remains controversial how will the spine develop after so early reconstructive surgery, including in situ stable anterior fusion carried out by titanium mesh with auto-rib.

1. Introduction

Infectious spondylitis in paediatric patients is extremely rare, and its study is usually limited to the clinical features and treatment of spinal tuberculosis or non-specific spondylodiscitis.

Diaphragm relaxation is rare paediatric pathology also: a one-side high position of the top of the diaphragm with a normal low thoracic-aperture fixation line could be caused by

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either primary congenital abnormality (aplasia) or secondary developmental insufficiency of muscular elements (atrophy or dystrophy) of the diaphragm.

We observed a child with a combination of both forms of the pathological condition. Surgical treatment was carried out at an early age, and it involved simultaneous spinal and diaphragm correction.

2. Case description

The 7-month-old girl was admitted into our clinic in May 2013 for differential diagnosis of spinal pathology between tuberculosis (TB) spondylitis and congenital spinal abnormality.

It was the mother's second pregnancy and, while pregnant, she was diagnosed with anaemia and pyelonephritis. The patient's birth was by caesarean section because of the uterus' scar (the older sibling is healthy). The primary and secondary Apgar's scale were estimated 8/8, the weight being 3100 at birth. No infectious contact was found in the family and closed relatives.

The child was healthy up to 1.5 months with a physiological weight gain. The onset of disease associated with a high temperature (38 °C) and dyspnoea. She was hospitalised with a diagnosis of right-side pneumonia (the X-ray was not presented for revision), and treated by empiric regime of antibiotics (cefazolin, claforan and amoxiclav) with a positive clinical effect. On the X-ray control, the pneumonia was resolved, but suspicion over the high level of the right diaphragm was expressed.

One month later (at the age of 2.5 months) the temperature increased up to 39 °C associated with anxiety, dyspnoea, bilateral pneumonia, ENT (ear, nose and throat) infection and intestinal syndrome. *Staphylococcus aureus* was found in the stool. Antibacterial drugs including cephalosporin (3-rd generation), ampicillinum and amoxiclav as well as anti-staph. bacteriophages. The treatment led to significant clinical improvement.

At the age of 4 months, during a stable period, the parents found the spinal deformity. After X-ray and computed tomography (CT) examinations the spinal pathology was assessed as a spondylitis. The Pott's disease (TB spondylitis) has also been proposed.

At the time of admission: the 7-month-old girl with normal motor activity; however, examination showed some lag in weight (7 kg). Her skin was moderately pale; peripheral lymphatic nodes were not increased; cordial tones, breath, bladder and bowel function were normal. The results of the clinical blood analyses, incl. leucocyte rate and erythrocyte sedimentation rate (ESR) are equal to the age. Immunological investigation did not reveal any compromise of the immune system.

Status localis: thoracic kyphosis with a prominent spinous process, pain-free palpation and no neurological deficit were observed.

X-ray (Fig. 1) and CT (Fig. 2) reveal the high level of the diaphragm top on the right side in comparison with the left side (the ribs 6 and 9, correspondingly) and destroyed vertebral bodies Th8–Th10, with a total absence of Th8 and Th9. The local kyphosis was 54°. The absence of a pronounced soft tissue component; the osseous inclusions in the epidural and paravertebral spaces (corresponding to the projection of the anterior and posterior ligament longitudinal) were detected.

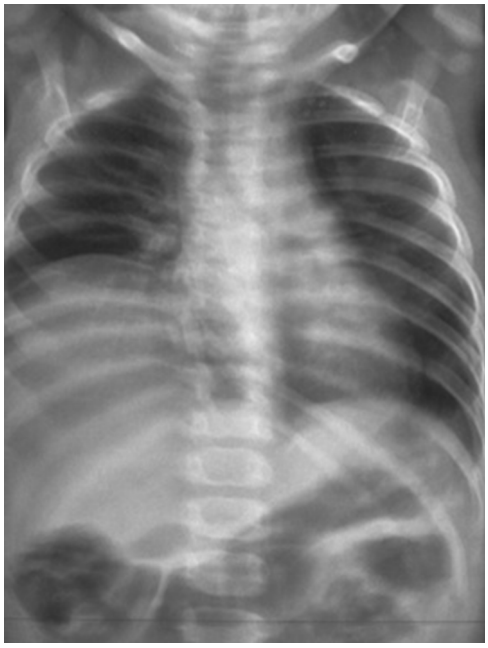

Fig. 1 – X-ray of the thorax at the age of 7 months. The right top of the diaphragm is at rib 6; the left is at rib 9.

The results of TST (tuberculin skin tests: RM 2TE and Diaskine test (Russian national analogue of the IGRA-test (interferon gamma release assay))) are negative. No ENT and neurologic pathology were revealed.

In the aggregate data, the diagnosis of TB spondylitis appears questionable. The pathology is regarded as transferred non-specific multi-focal infection with a vertebral lesion complicated by unstable kyphosis. Diaphragm relaxation could be caused by congenital abnormality as by infectious lesion (pneumonia). Because of the pure prognosis for spinal deformity progress and the risk of neurologic complication, the decision for surgery with a simultaneous correction of spinal and diaphragm pathology was made.

Two-stage one-narcosis surgery was performed on 20 May 2013: in the first stage, the position was on the *left side*. The right-side trans-thoracic access is via rib 7. The expressed adhesions between the visceral and parietal pleura were discovered and dissected. The diaphragm's tendon centre and sternal part appeared as a thinly stretched plate; the costal and lumbar portions were the preserved muscle structure. The right dome of the diaphragm was sutured in view of the blood supply mainly because of tendon centre duplication. The *lig. longitudinale ant.* had cut at the level of deformity. The expressed scar soft tissues changes were detected. The remaining fragments of the vertebral bodies and scar tissues were removed with anterior spinal decompression. The anterior fusion Th7–11 was achieved using a titanium mesh (inner diameter 10 mm) with an auto-rib inside it.

For the second stage, the patient was in the prone position. Th9 laminectomy accompanied by posterior Th5–L1 instrumentation was performed by low-profile multi-hooks construction.