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Spondylodiscitis in familial dysautonomia: a case report

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Abstract. – Familial dysautomonia (FD, or Riley-Day syndrome) is a rare but fatal autosomal recessive peripheral neuropathy caused by a point mutation in I-κ-B kinase complex associated protein *(IKBCAP)* gene.

The disease, that affects primarily people of Ashkenazi Jewish origin, prejudices the development of primary sensory neurons determining depletion of autonomic and sensory neurons. Musculoskeletal problems include: spinal deformities, foot deformities, fractures and arthopathies.

In this article we review a case of a 34 years old male of non-Jewish origin affected by FD presenting L2-L3 kyphosis and inability to walk due to chronic L2-L3 spondylodiscitis not surgically treated 14 years before as acute disease.

De novo spondylodiscitis affecting patients presenting FD and its subsequent management was not previously described in the literature.

Key Words:
Spondylodiscitis, Familial dysautonomia, Surgical treatment, Antibiotics therapy.

Introduction

Familial dysautonomia (FD) or Riley-Day Syndrome is a rare autosomal recessive disorder most frequently reported in patients of Eastern European Jewish heritage[1]. World-wide approximately 600 cases of FD are registered[1]. FD is caused by a point mutation in I-κ-B kinase complex associated protein (*IKBCAP*) gene and subsequent defects in the protein it encodes, IKAP[2-4]. One of the hallmark findings in FD is the reduced amount of sensory and autonomic neurons which leads to altered sensory perception including reduced pain, temperature and vibration sensation[2-4]. Other findings include spinal deformity (scoliosis, kyphosis)[5-11], dysautonomic crises, altered gastrointestinal (GI) motility, cardiac and respiratory dysfunction[2-4]. Deep wound infections following spinal fusion have been reported in FD but de novo spondylodiscitis and its subsequent management has not been reported to date[6].

Case Report

A 34y/o male of non-Jewish heritage diagnosed with FD was admitted to our clinic for increasing kyphosis associated to ambulation difficulty with claudicatio.

Accurate clinical history was collected and it was clear that, when the patient was a child, he used to bite his fingers with subsequent recurrent *S. aureus* infections of his distal phalanges resulting in several amputations at his distal interphalangeal joints as well as extraction of his teeth. He was also noted to have minimal lacrimation as a child along with the absence of fungiform pappilae on his tongue. Both of these findings are common in FD[13,14].

When the patient was 20 years old he was diagnosed with acute *S. aureus* spondylodiscitis of L2-L3 that was managed with bed rest and antibiotics in another hospital.

On examination, 14 years after the acute spondylodiscitis, he was without fever but C reactive protein was 11.9 with white blood cells count of 10.3. Lumbar discomfort to palpation was present.

No lower extremity motor strength weakness were recorded but, as a common finding in FD, deep tendon reflexes were completely absent[12].

Bending was possible but walking was extremely limited and claudicatio was present. The patient was able to walk for 20 meters maximum.

Due to FD, subjective pain was impossible to define.

Recent X-rays demonstrated focal L2-L3 kyphosis due to erosion of L2 inferior endplate

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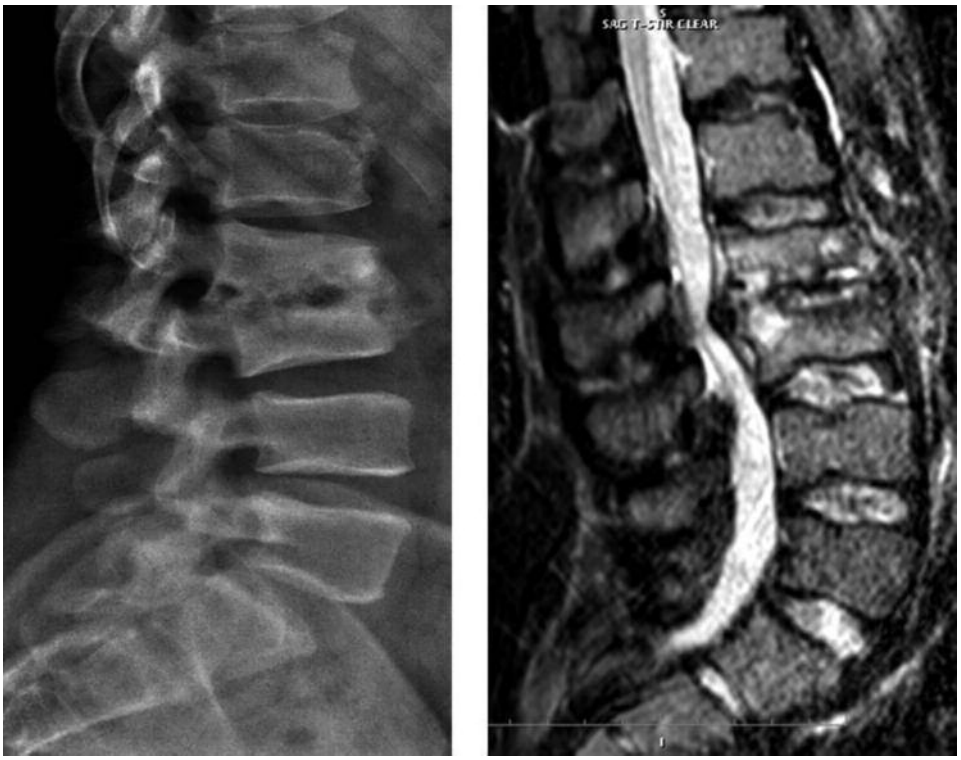

Figure 1. X-ray and MRI show focal L2-L3 kyphosis, erosion of L2 inferior endplate and superior L3 endplate with degeneration of the L2-L3 disc and segmental L2-L3 stenosis.

and superior L3 endplate associated to indirect evidence of significant degeneration of the L2-L3 disc, confirmed by MRI. Segmental L2-L3 stenosis was present (Figure 1).

Bone scan and Positron emission tomography (PET) demonstrated increased uptake in the L2 and L3 vertebral bodies and disc space (Figure 2).

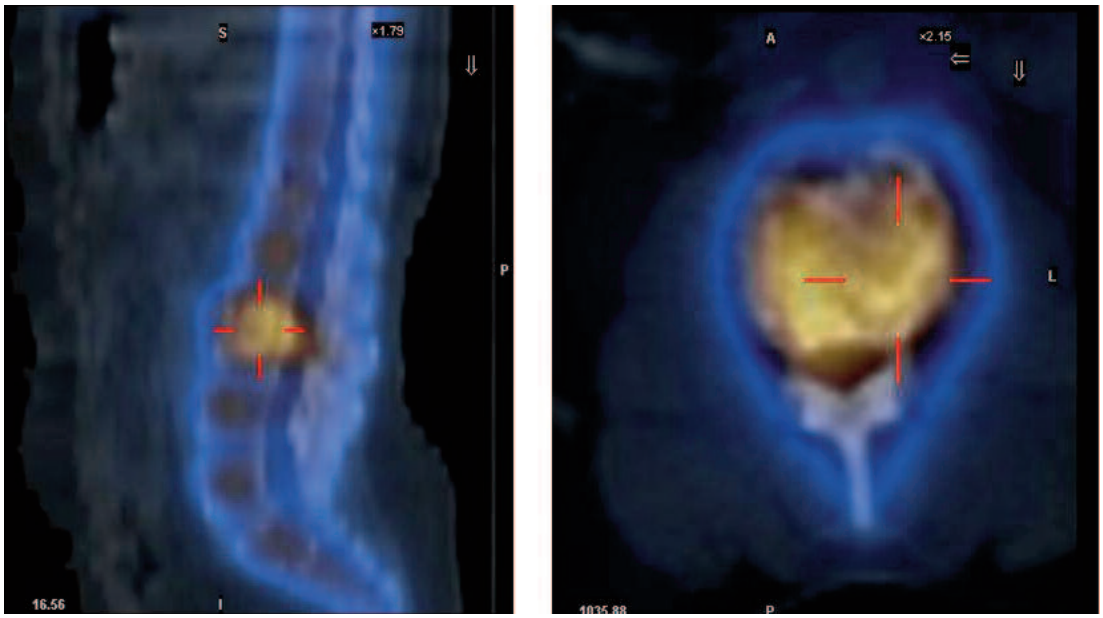

Figure 2. Positron emission tomography (PET) demonstrated increased uptake in L2 and L3 vertebral bodies and disc space.

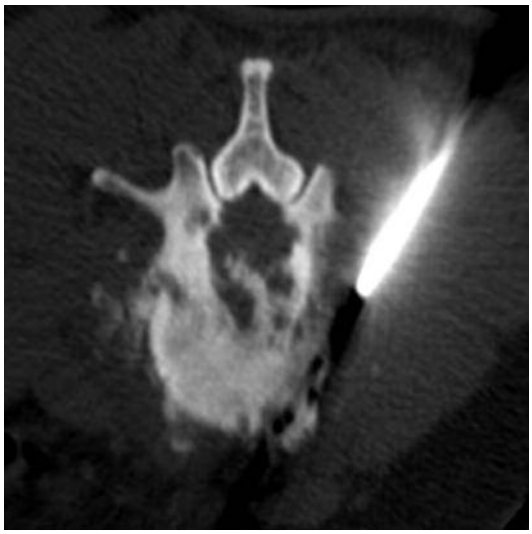

Figure 3. L2-L3 CT-guided trocar biopsy.

Considering the patient's clinical history and all the images collected L2-L3 CT-guided trocar biopsy was performed first and the final diagnosis was chronic spondylodiscitis (Figure 3).

After diagnosis the patient was scheduled for the surgical treatment and L2-L3 decompressive laminectomy, L2-L3 discectomy, curettage and debridement of the L2 and L3 vertebral bodies and T12-L4 instrumentation was performed. Rib allograft was placed in L2-L3 disc space for interbody fusion (Figure 4).

Intraoperative specimens were sent to pathologist and microbiologist and the final report demonstrated a typical morphology of chronic spondylodiscitis.

After surgery the patient started appropriate antibiotics therapy (Teicopanina and Tazocin) based on infettivologist recommendations.

Two days after surgery the patient was able to walk without corset and was discharged home 10 after surgery.

After 4 months F.U. the patient was experiencing a partial recurrence of his walking difficulties.

Antibiotics therapy was stopped just few days before.

Lumbar spine X-Rays and CT scan were performed and demonstrated loosening of the L4 pedicle screws (Figure 5) but partial L2-L3 interbody fusion.

Considering the clinical findings and the last blood exam (C reactive protein: 0.71) and after a mandatory evaluation of this particular case together with infettivologist, we decide to revise surgically the patient removing hardware and supplementing the existing rib allograft in L2-L3 disc space with demineralized bone matrix (DBM).

Specimen were sent to the laboratory for microbiologic and histological evaluation and were complete negative for infection.

Specific rehabilitation protocol was started immediately after surgery and walking was allowed just with the use of a corset. The patient worn the

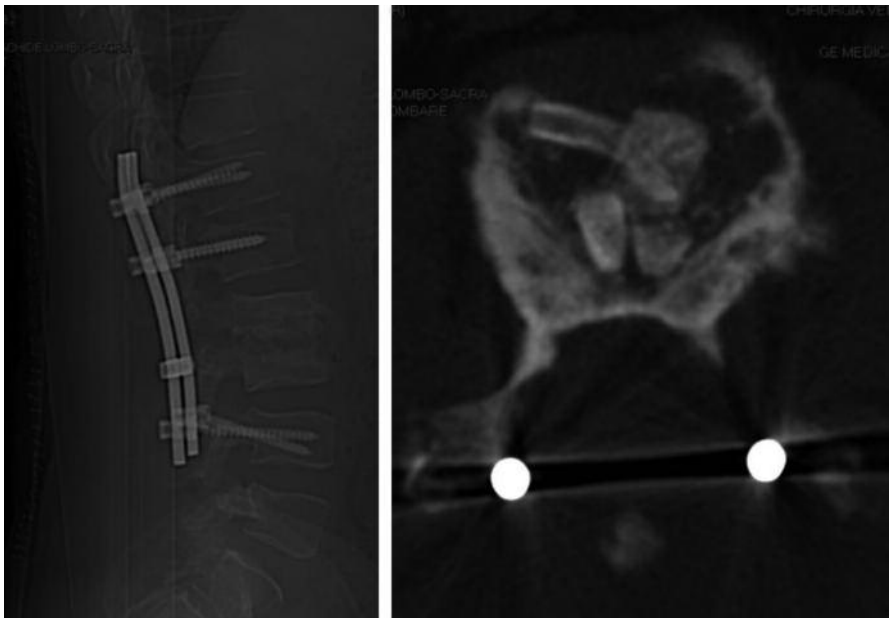

Figure 4. Post-operative X-ray that show T12-L4 instrumentation and L2-L3 decompressive laminectomy, discectomy, curettage and debridement. CT-Scan shows rib allograft placed in L2-L3 disc space.

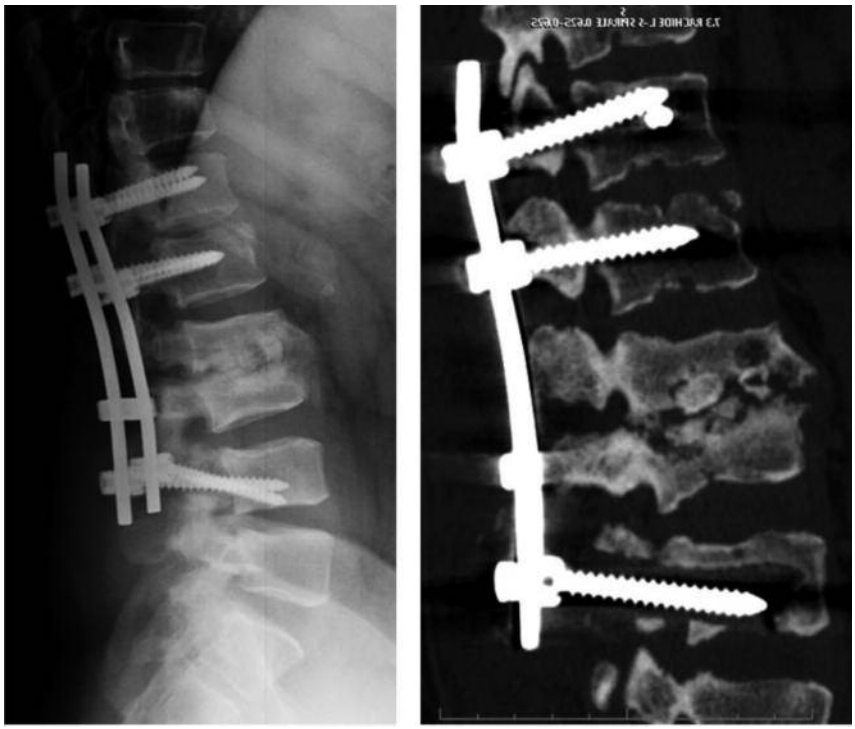

Figure 5. X-Rays and CT-Scan show loosening of the screws in L4 and partial L2-L3 interbody fusion 4 months after surgery.

corset for six month after surgery for sitting, standing and walking.

One year after second surgery the patient is able to walk without any limitation and X-Rays shows positive evolution of L2-L3 fusion without kyphosis (Figure 6).

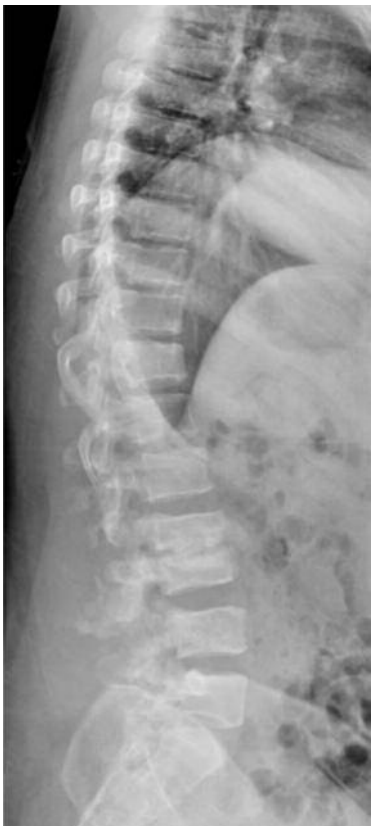

Figure 6. Final F.U.: 1 year after second surgery X-ray shows good evolution of L2-L3 interbody fusion without deformity.

Discussion

Familial dysautonomia (FD) or Riley-Day syndrome is a member of genetically distinct disorders referred to as Hereditary Sensory and Autonomic Neuropathies (HSAN)[3,4]. These disorders share defects in the function of sensory and autonomic nerves and FD is referred to as HSANIII[3,4]. Diagnostic tools for FD include confirmation of the gene mutation[3], absence of fungiform papillae on the tongue[14], Ashkenazi Jewish heritage[1,3] defective lacrimation[13], diminished deep tendon reflexes[12] and the absence of axonal flare after intradermal histamine injection[15]. There is currently no cure for FD and management is symptomatic[4]. The recent innovations in induced pluripotent stem (IPS) cells do hold promise for FD[2]. Prenatal screening has also helped to decrease the incidence of FD[16].

Although our patient was of non-Jewish heritage he demonstrated the clinical findings of FD:

defective lacrimation, absence of fungiform papilla, absence of deep tendon reflexes, diminished sensitivity to pain and temperature. There are some reports of FD in patients of non-Jewish heritage[17]. FD is commonly associated with scoliosis and kyphosis with an estimated prevalence of 83% to 86%[10,11]. Our case is unique as the patient developed focal kyphosis at L2-3 level following antibiotic management of spondylodiscitis 14 years before. Patients with FD are not genetically predisposed to infections. FD patients manifestation of an infection is however atypical[18]. Infections may present only with a fever and dysautonomic crisis and the provider needs to have a high index of suspicion in these situations.

In the literature, to our knowledge, there is one case of spinal charcot arthropathy in a patient with congenital insensitivity to pain[19]. In their description of diagnostic findings (normal lacrimation, normal histamine test, normal temperature appreciation and two point discrimination), Piazza et. al conclude the patient did not have FD but rather another type of HSAN[19]. Our patient's deformity was the final result of infection rather than charcot arthropathy or FD related spinal deformity.

The first surgical procedure was performed to decompress the spinal cord and give mechanical stability to the spine. Mechanical stability, obtained using instrumentation skipping L2 and L3 levels, was necessary to improve the efficacy of antibiotic therapy and correct kyphotic deformity.

Even if 4 month after surgery L4 screws loosening was recorded, the infection was completely healed and partial L2-L3 interbody fusion was present.

Considering also the patient's relative sedentary lifestyle hardware removal was performed.

Instrumentation failure is a frequent complication following spinal instrumentation in FD[6,7,11]. Bar-On et al[11] reported that 9 out of 24 (38%) FD patients operated for spinal deformity had instrumentation problems. The complications occurred in the early post-operative period. One of these patients had screw loosening as observed in our patient. Rubery et al[5] series also had instrumentation failures, all hooks, in 4 of 22 patients (18%). Osteopenia in FD could be a contributing factor to the instrumentation failure. FD patients have a prevalence of fractures as high as 53% in a cohort of 79 patients[20]. Low body mass index (BMI) due to gastrointestinal issues, diminished weight bearing, high bone turnover and changes in bone perfusion may lead to osteopenia in FD[20]. Therapeutic intervention for low BMI in FD has not been reported to date but it may be of use before surgery.

Conclusions

We report the first case discussing the surgical management of spondylodiscitis associated deformity in FD. As reported in previous studies FD patients have high rates of postoperative complications with instrumentation failure being one of the leading complications. Osteopenia in FD can contribute to the instrumentation failure. We recommend bone mineral density testing and if values below average are found we recommend to engage an endocrinologist in the care of the patient prior to instrumented spinal fusion.

Acknowledgements

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Conflict of Interest

The Authors declare that there are no conflicts of interest.

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