

# A Unique Case of Severe *Morganella Morganii* Meningitis in Patient with Spina Bifida Oculata and Dermal Sinus

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## Case Report

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## Abstract

This case report is about a 13-year-old male patient who had spina bifida oculata at L5-S1, combined with dermal sinus. He was admitted in the Clinic of Infectious Diseases of a University Hospital in Stara Zagora with typical clinical signs of acute meningitis. Based on the anamnestic, clinical, laboratory, microbiological, virological and imaging methods, bacterial meningitis caused by *Morganella morganii* was diagnosed. The disease had a prolonged, severe course requiring rehospitalisation and prolonged treatment. The causative agent was only cultivated in CSF, while blood, urine and copro cultures were negative. Antibacterial treatment, despite the wide range of susceptibility of the causative agent, did not result in a favorable response. The combination of conservative and operative therapy lead to eradication of the infection and recovery.

**Keywords:** *Morganella Morganii*; Meningitis; Spina Bifida; Dermal Sinus

## Introduction

*Morganella morganii* is a Gram-negative microorganism, formerly known as *Proteus morganii* [1]. It has a commensal relationship within the intestinal tracts of humans, mammals, and reptiles as normal flora [2].

*M. morganii* is an uncommon cause of community acquired infections. Most commonly it occurs as a nosocomial infection of the urinary, digestive systems, and soft tissues after surgery [3]. Predisposing factors to the *M. morganii* infection are prolonged therapy with  $\beta$ -lactam antibiotics, diabetes, surgical procedures, old age, perinatal contamination [4]. We report a case of a 13-

year-old boy with severe meningitis caused by *M. morganii*.

The child was born with Spina bifida oculata at L5-S1 level and according to the parents' data from the hairy recess in the sacral area occasionally a yellowish liquid flows out.

Surgical intervention to correct the anomaly was not conducted due to parents' disagreement. Up to 6 months of age, the patient experienced convulsions. The boy has proper neurological and physical development, he is a 7th grade student.

He was hospitalized at the Clinic of Infectious Diseases of the University Hospital in Stara Zagora on 10.08.2018

with complaints of headache, nausea, vomiting, fevering up to 37.8°C, with a 3-day duration.

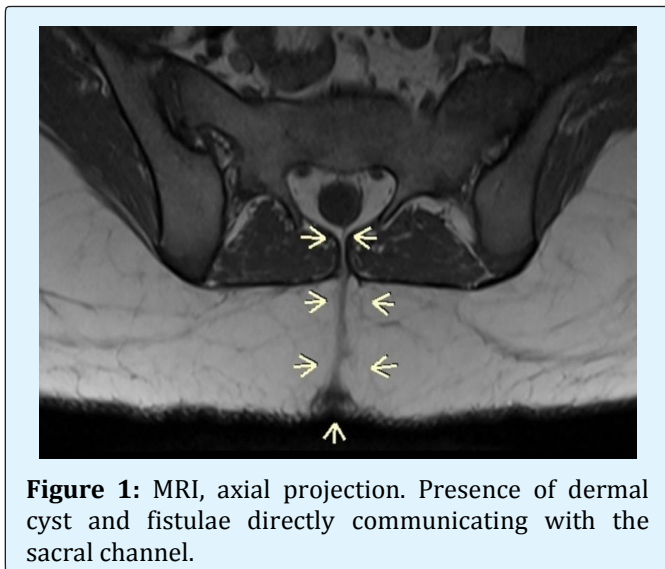
From the physical exam, the patient was conscious, with fever of 38.4°C, pronounced photophobia, hyperemised throat, respiratory rate 44 of breaths/ min, heart rate of 120/min. From the neurological exam there was only neck stiffness with enhanced tendon reflexes.

At the L5-S1 level, a 0.5-0.7 cm groove was seen, masked by increased hair growth, with no visible evidence of an inflammation.

The complaints were of varying dynamics. A second fever peak to 39°C was displayed on the fifth day of the hospitalization.

Multiple CSF (cerebrospinal fluid) tests showed evidence for purulent meningitis - Leuc. up to 1098.10<sup>6</sup>/L with polinuclears in 93%, glucose level 0,2 mmol/L. The blood, urine and coprocultures performed, as well as nasal, throat swabs and skin wash from the recess prior to the onset of antibiotic therapy without bacterial growth. *M. morganii* was proven from the first cultivation of CSF. Its identification was performed with a Vitek 2 Compact system (BioMerieux, USA) using a GN card. Antimicrobial susceptibility was tested with AST-N204 EUCAST, version 4.0.

CT and MRI revealed an unclosed spinal arc without meningocele. Dorsal dermal sinus was found in the lumbosacral section. On the S2 level there was seen a fistula between the spinal canal and the skin (Figure 1).



**Figure 1:** MRI, axial projection. Presence of dermal cyst and fistulae directly communicating with the sacral channel.

Etiological treatment according to the antibiogram - Ceftriaxon 2 x 2.0 g, Amikacin 2 x 500 mg i.v. was carried out for 16 days. Dexamethasone and Mannitol as osmodiuretic were added.

The patient was discharged with improvement. Therapy with Cefixime x 400 mg p.o was given for 7 days.

Five days after dehospitalization headaches, vomiting reappeared with dizziness and photophobia requiring re-hospitalization. On the readmission: fever up to 38.8°C with moderate neck stiffness and disturbed gait. Lumbar puncture revealed a relapse of the purulent meningitis by re-isolation of *M. morganii* from the CSF. Pleocytosis was higher than the previous stay – up to 7787.10<sup>6</sup>/L with polinuclears in 97% and lower hypoglicorachia-0,02 mmol/L. *M. morganii* had the same antimicrobial sensitivity. This time a combination of Ceftazidime, Amikacin and Ciprofloxacin was started. The control lumbar punctures, showed a good response with reduction of pleocytosis, but retained proteinorachia and hypoglycorachia. Second peak of fever up to 39.3 ° C with increased headache, nausea and somnolence imposed change of antibacterial therapy with Meropenem 3 x 2.0 g and Sulfamethoxazole/Trimethoprim 2 x 1.0 g i.v. After a 22-days hospital period, objective status and laboratory parameters were improved, and the patient was referred to a neurosurgery clinic for surgical treatment of dermal sinus.

The condition of the patient was progressively improved after the intervention. At home therapy was continued with Trimetoprim/sulfametoxazol 2 x 960 mg for another 14 days p.o., Fluconazole x1 t. p.o. and probiotics. The routine examination after one month revealed normal somatic and neurological status, primarily healed surgical wound normal laboratory blood tests. Tracking up to the 6th month shows full recovery.

## Discussion

The case presented was one of the few known cases of neuroinfection caused by *M. Morganii* [5]. As a primary location of *M. morganii*, infections of the urinary system were most commonly described [6]. The entrance door to *M. morganii* infection might be also the gastrointestinal system, skin and soft tissues [7].

In our patient, the urine, blood and coprocultures did not show bacterial growth.

It was known that *M. morganii* is often found to be a nosocomial infectious agent [8]. However, our patient came with *M. morganii* neuroinfections from his home without previous hospitalization. The clinical picture of meningitis caused by *M. morganii* was presented with fever, neck stiffness, impaired consciousness, seizures, and CSF abnormalities [5]. All these findings were present in our patient, with the exception of seizures. The blood and CSF tests showed typical for bacterial neuroinfection changes. The incidence of *M. morganii* bacteraemia reached 70.5% especially as nosocomial infection [9]. In contrast, however, the blood cultures in our patient were negative.

The most severe cases had been reported in patients with impaired immunity [10]. The immunoglobulins IgA, IgE, IgG, as well as C3 and C4 fractions of the complement in our patient were in reference values.

According to the literature, the intramedullary dermal sinus was localized most commonly in the lumbosacral region and frequently accompanied spina bifida ocluta [11]. The imaging studies in our case indicated a synchronous presence of spina bifida with dermal sinus with external communication to the skin. The entry door of the infection was most likely the fistula. Some authors shared the idea of a direct invasion of *M. morganii* in the CNS [8].

Patient's improving during the first hospital stay gave us reason to assume that the infection was well managed and the patient could recover completely with oral therapy at home with subsequent neurosurgical intervention. However, the repetition of purulent meningitis with the same etiological agent suggested that surgical intervention was imperative.

Patients with *M. morganii* bacteraemia usually had a severe clinical course with high lethality ranging from 36% to 42%, the prerequisite for which the data are diabetes mellitus, polymicrobial bacteraemia, and inadequate antibacterial therapy [12]. However, most cases of *M. morganii* infection were well-influenced by appropriate antibiotic therapy [13]. *M. morganii* had intrinsic resistance to oxacillin, ampicillin, amoxicillin, most of the first- and second-generation cephalosporins and macrolides [8]. In the present case, the isolated bacterium was sensitive to a wide range of antibiotics, ceftriaxone, ceftazidime, ertapenem, imipenem, tetracycline, aztreonam and trimethoprim/sulfamethoxazole.

## Conclusion

We described unique case of an immunocompetent patient with *M. morganii* meningitis due to a fistula between a spinal canal and the skin in combination with spina bifida ocluta. In such cases the conservative treatment despite the good susceptibility of the isolated *M. morganii* is not enough to eradicate the neuroinfection. Therefore, the combination of antibacterial therapy with surgical treatment to eliminate the primary source is mandatory.

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## Conflict of Interest

All authors of this manuscript declare they have no competing interests.

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## Ethical Approval

All data used in this manuscript are given with the explicit consent of the patient's parents as he is a minor. The approval of the Ethics Committee at the University Hospital, Stara Zagora, Bulgaria, has been sought and received

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