NECROTISING FASCIITIS DUE TO INVASIVE STREPTOCOCCUS PYOGENES INFECTION

I.Ziuraite^{1,2}, A.Narkute^{1,3}, V.Burokiene^{1,2}, V.Zilinskaite^{1,2}, D.Proskute⁴, I.Ivaskeviciene^{1,3}

¹Clinic of Children's Diseases, Institute of Clinical Medicine, Vilnius University Faculty of Medicine, Vilnius, Lithuania

²Children's Hospital, Affiliate of Vilnius University Hospital Santaros Klinikos, Paediatric Emergency Medicine, Intensive Care and Anaesthesiology Centre, Vilnius, Lithuania

³Children's Hospital, Affiliate of Vilnius University Hospital Santaros Klinikos, Paediatric Centre, Department of Paediatric Infectious Diseases, Vilnius, Lithuania

⁴Children's Hospital, Affiliate of Vilnius University Hospital Santaros Klinikos, Paediatric Surgery Centre, Vilnius, Lithuania

Necrotising fasciitis (NF) is a rare and life threatening condition where early recognition and surgical intervention are essential factors for good outcomes. We present the first case of NF in Children's Hospital during the last decade.

Case Presentation

10-year-old boy was diagnosed with herpetic stomatitis. Five days later he presented to ED complaining of painful erythematous swelling of the left temporal area, photophobia, and persistent mouth lesions. At presentation he was febrile, drowsy (GCS 13), in pain, but haemodynamically stable.

Fig. 1a,b Patient's condition was worsening dramatically during the first hours at the hospital. The rash on the left side of the face has spread and became haemorrhagic.

Patient was admitted to PICU due to suspected NF. He was started on acyclovir, clindamycin, meropenem, and IV fluids. Laboratory workup showed highly elevated inflammatory markers and liver enzymes, coagulopathy. Head CT showed left side facial tissue oedema, parapharyngeal infiltration on the left and brain oedema.

Fig. 2 Head CT
 Infiltration of left retro- and parapharyngeal space, dislocation of left tonsil.
 Muscles and intermuscular space in the left masticator area non-homogenic, hetero dense, blurred borders of contrast media accumulation. Muscle tissue oedema.

Enlarged and non-homogenic left salivary gland. Enlarged submandibular and neck lymph nodes, with pronounced accumulation of contrast agent. Left eyelid infiltration and oedema, and slight oedema of orbital tissue. Infiltration of left side face tissue.

Maculopapular rash was spreading to all body parts, especially the legs.

Fig. 3 Maculopapular rash on the leg.

There was anaemia, thrombocytopenia, worsening kidney and liver function, and increasing inflammatory markers.

Despite treatment patient progressed to septic-toxic shock (TSS), and respiratory failure. He was started on vasopressors, mechanical ventilation, IV immunoglobulin.

Surgical intervention. Day 1.

Left temporal zone, upper and lower eyelids, periocular area, maxillar zone **tissue layers found separated, with surrounding serohaemorrhagic fluid.**

There was excessive drainage of fluid through drains, crepitation and progression of tissue necrosis during the next days.

The patient has undergone multiple life-saving surgical interventions. *S.pyogenes* was detected in the wound culture. Histological examination revealed skin, subcutaneous tissue and muscle necrosis. IV penicillin was added to antimicrobial treatment.

Fig. 4 Day 6: the left side of the patient's face before and after necrectomy.

On the 7th day the patient was haemodynamically stable, vasopressors and mechanical ventilation were discontinued. On the 12th day he has recovered and was transferred to Paediatric Burn and Plastic Surgery ward for reconstructive surgery.

Literature

1. Zundel S., Lemaréchal A., Kaiser P., Szavay P. "Diagnosis and Treatment of Pediatric Necrotising Fasciitis: A Systematic Review of the Literature". Eur J Pediatr Surg. 2017 04;27(2):127-137.
2. Uptodate "Necrotising soft tissue infections" last reviewed March 2018.
3. Wilkins AL, Steer AC, Smeesters PR, Curtis N. "Toxic shock syndrome- the seven Rs of management and treatment". J Infect 2017, 06(74):147-152.

Literature review and discussion

- We consider breach in mucosal barrier and previous herpetic infection as an immunosuppressive state to have predisposed our patient to NF.
- Face is not a typical site of NF, trunk and extremities being affected in most cases. ¹
- Type I (classical) NF is a polymicrobial infection². Both aerobic and anaerobic species are isolated from tissue sample.
- Type II NF is monomicrobial infection, most commonly caused by *S.pyogenes* or *S.aureus*². While head and neck NF is usually caused by anaerobic species from the mouth, in our case it was most likely the translocation of bacteria from the pharynx.
- **NF is a surgical emergency. Without early surgical treatment NF is almost always fatal.** ^{1,2,3}
- Empiric antibacterial treatment suggestions vary greatly between guidelines. However, they all agree, that it should be started with broad spectrum antibiotics, covering most common type I and II NF causing agents.
- Clindamycin is considered as adjunctive therapy due to its effect on toxin production and overcoming "Eagle effect"- decreased ability of penicillin to act on bacteria.³
- The use of IV immunoglobulin as an adjunctive therapy is still discussed³. Considering serious condition of our patient and available recent literature reviews with promising results, he was given IV immunoglobulin therapy.

Learning Points

1. Early recognition of NF and prompt surgical intervention are crucial and lifesaving.
2. Previous viral infection with breach of skin and mucosal barriers have possibly made patient more susceptible to NF.
3. *S.pyogenes* is a common etiologic agent of NF. Patients are always at risk of progression to TSS, and requires intensive care.
4. Role of IV immunoglobulin in the treatment of TSS is still under discussions.