



An adjuvant therapy in cervical necrotising fasciitis: hyperbaric oxygen treatment

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Abstract

Kearn sayre syndrome (KSS) is a rare disease with a typical onset before 20 years and characterized by triad of chronic progressive external ophthalmoplegia, retinitis pigmentosa and progressive cardiac conduction abnormalities. The most important prognostic factor in KSS patients is the involvement of heart characterized by progressive degeneration of the conduction system. In patients with KSS, early diagnosis of cardiac involvement is very important because complete atrioventricular (AV) block may develop and it can be cause of sudden cardiac death. Herein we report a patient with KSS who presented with syncope due to complete AV block.

Keywords: Kearn sayre syndrome, atrioventricular block

Introduction

Cervical necrotising fasciitis is a life-threatening deep neck infection characterised by rapidly progressing necrosis of the superficial fascia and subcutaneous tissues [1]. Although it is seen in every age group, it occurs most often in those aged over 50 years. Within the general risk factors are conditions which affect the immune system such as diabetes mellitus, advanced age, acute or chronic renal failure, post-partum status, alcoholism, use of intravenous drugs, malnutrition, malignancy, peripheral vascular disease or exposure to radiation [2]. Although the head and neck region is rarely involved in necrotising fasciitis, previous studies have shown that 5%-10% of cases comprise head and neck infections [3]. The site of entry of infection in these areas is often the teeth, tonsils, pharyngeolaryngeal mucous or the skin. The endotoxins, exotoxins and proteases expressed in these infections disrupt the microcirculation causing the spread of vascular thrombosis and soft tissue necrosis [4]. Crepitation may be felt due to gas produced by subcutaneous bacteria. Subsequently, with the rapid development of toxic or septic shock, the patient may be lost through multi-organ failure. The standard treatment is emergency surgical debridement and intravenous antibiotic treatment. In the treatment there is a need for broad spectrum antibiotherapy, including both gram positive and gram negative aerobes and anaerobes. Despite appropriate antibiotherapy, the mortality rate has been reported as 40%-76% [5]. Additional treatment

methods have been researched for the reasons of this high mortality rate. The most widely-used of these is hyperbaric oxygen (HBO) treatment. HBO therapy is based on a simple diffusion principle to increase the amount of oxygen in the tissue [6,7].

Case

A 51-year old male patient with a 20-year history of diabetes presented at our clinic with complaints of pain, swelling and redness below the left jaw. In the physical examination, a painful, erythematous swelling approximately 5-6 cm in width was determined below the left mandible. On ultrasonography (USG), an increase was determined in cutaneous and subcutaneous tissue thickness of the left lateral of the neck and a heterogenous lesion in which sporadic air echogenicity was observed, whereby borders and dimensions could not be clearly evaluated. During USG, a Penrose drain was applied and a culture was taken as there was spontaneous drainage. Parenteral antibiotic treatment was started for the patient. Despite two days of treatment, as there was no improvement in the symptoms, the Infectious Diseases Clinic was consulted, the antibiotic treatment was corrected and computed tomography (CT) imaging of the neck was taken (Figure 1). On CT; there was an abscess formation, showing extension of 78 x 31mm in the axial plane and 100mm in the vertical plane with cutaneous-subcutaneous location, accompanied by scattered air images and fluid loculations with dense contents. With the appearance of subcutaneous fluid and air on CT and as the symptoms did not improve, emergency surgical debridement was applied for an initial diagnosis of necrotising fasciitis on the 3rd day of hospitalisation (Figure 2).

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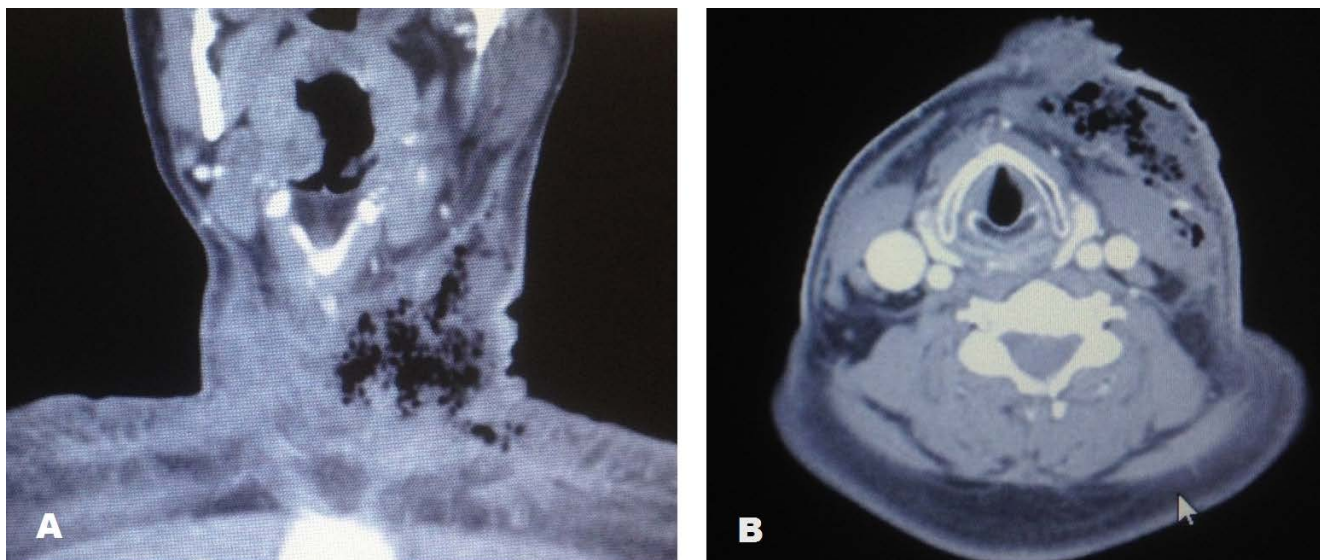


Figure1. Abscess formation, accompanied by scattered air images and fluid loculations.



Figure 2. Surgical debridement was applied for an initial diagnosis of necrotising fasciitis.

In the postoperative period, a daily dressing was applied with topical rifampicin. With the patient's consent, HBO treatment was started at 2.5 Atm pressure for 10 days. In the abscess culture, group C streptococcus reproduction was reported. On the first day of hospitalisation, CRP was 221 mg/l and WBC was 20,000 and following surgical debridement, these values receded to CRP 187 mg/l and WBC 15,000. Together with the start of HBO 2 days after the surgical debridement + medical treatment, CRP was determined as 19.8mg/l and WBC as 9.8. Treatment for tooth decay was also provided in consultation with a dental practitioner. Wound recovery was observed to be more rapid with the treatment

protocol applied. On the 10th day, the infection that had not completely receded in the supradeloid region was debrided and at the end of 1 month, the tissue defect was closed and recovery was seen to have been achieved (Figure 3).



Figure 3. Improvement of the the tissue defect in one month.

Discussion and Conclusion

Necrotising soft tissue infections are rarely seen infections which may involve the skin, subcutaneous tissue, fascia and muscle. In the early stage, they cannot be differentiated from superficial soft tissue infection [8]. The criteria used for differentiation from other infections are findings such as widespread necrosis in the superficial fascia, rapid spread, systemic toxicity, myofasciitis, and diffuse gas bubbles on CT (3). Depending on the agent micro-organism, classification is into 4 types. The most frequently seen (80%) polymicrobial etiology is Type 1 [2]. Often seen agents are Group A beta-haemolytic streptococcus, staph. aureus, strep. viridans, Klebsiella pneumonia, Pseudomonas aeruginosa, gram negative bacilli and

anaerobes [9]. In literature, odontogenic causes have been shown to be the most common source [10-12]. Necrotising fasciitis morbidity and mortality are high in comorbidities [13].

In the current patient, the primary risk factors were the presence of diabetes and odontogenic reasons.

HBO treatment is applied in a completely closed pressurised room with respiration given via a mask at pressure higher than 1 atmosphere (1 ATA= 760 mmHg) or initially at 100% oxygen. By increasing tissue PO₂, better oxygenation of the tissues is provided. With the increase in tissue PO₂ formed with the effect of H₂O₂, superoxide anions and oxygen radicals, a bacteriocytic and bacteriostatic effect is created. The effect made on phagocytosis by PNL and macrophages is increased. Toxic production of bacteria is halted. By increasing the mucopolysaccharide structure, angiogenesis is accelerated. Tissue oedema decreases. Collagen production and fibroblastic activity increase [14]. PO₂ in infected tissue may rise as high as from 30 mmHg to 120 mmHg [15]. It has been determined that HBO treatment is effective in several studies. Orhonen et al found the mortality rate to be 9% in a study of 33 cases [16].

Following abscess drainage, in patients receiving HBO treatment additional to daily debridement and antibiotic treatment a more rapid recovery has been seen of clinical and laboratory findings. Wound healing has been observed to be more rapid due to a reduction in local tissue oedema throughout the treatment and the acceleration in epithelialisation associated with increased local oxygenation.

In conclusion, it can be said that in cases of necrotising fasciitis which have high mortality rates despite appropriate antibiotic treatment, HBO is an effective adjuvant therapy required at the start of the early stage following surgical debridement and antibiotherapy, as it has both immunomodulator and bacteriostatic effects.

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