DEVELOPMENT OF NECROTIZING FASCIITIS FOLLOWING VARICELLA IN TWO SISTERS

İki kardeşte su çiçeğinden sonra görülen nekrotizan fassiitis olgusu

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***Abstract**: Secondary bacterial infections are the most frequent complications of varicella; neutropenia, which can be encountered in varicella, predisposes patients to such infections. Recently, an increasing number of reports of primary varicella complicated by invasive streptococcal infection, including necrotizing fasciitis, have been cited in literature. This report presents a unique case in the literature in which two sisters simultaneously developed necrotizing fasciitis at the same localization secondary to a varicella infection. The cases were salvaged via prompt surgical intervention and medical therapy, and acceptable aesthetic results were obtained.*

***Key Words:** Varicella, Complications, Necrotizing fasciitis*

***Özet:** Sekonder bakteriyel enfeksiyonlar su çiçeğinin en sık görülen komplikasyonlarıdır ve su çiçeğinde görülebilen nötropeni, bu olaya yatkınlık sağlar. Son zamanlarda, nekrotizan fassiitisi de içeren, invaziv streptokok enfeksiyonları ile komplike olmuş primer su çiçeği olguları artmaktadır. Bu yazıda, iki kız kardeşte eş zamanlı ve benzer lokalizasyonlu olması nedeni ile literatürde yegane olan, su çiçeğine sekonder gelişmiş nekrotizan fassiitis olguları sunulmaktadır. Olgular hızlı cerrahi girişim ve medikal tedavi ile düzelmişler ve estetik olarak kabul edilebilir sonuçlar elde edilmiştir.*

***Anahtar Kelimeler:** Suçiçeği, komplikasyon, nekrotizan, fassiitis*

Secondary bacterial infections are the most frequent complications of varicella (1). Neutropenia can be encountered in varicella and predisposes patients to such infections. However, in cases in which prophylactic antibiotics are administered, secondary bacterial infections are rare (2).

Necrotizing fasciitis is an infectious and life-threatening disease which develops with aerob and anaerob bacteria in subcutaneous fat tissue and superficial fascia. It has been reported that in previously healthy children, necrotizing fasciitis rarely develops after primary varicella (3). However, in recent literature there has been an increasing number of reports of primary varicella complicated by invasive streptococcal infection, including necrotizing fasciitis.

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Case 1

A three year-old girl was examined in a primary health institution for skin eruptions, which were diagnosed as varicella, and was treated with a paracetamol group analgesic and antihistaminic a few days prior to admission to our hospital on the basis of discoloration of the inguinal region. The following day the patient was admitted to the paediatric infectious disease department based on a diagnosis of varicella and invasive streptococcal infection. An examination of the patient, whose health status was moderate, revealed widespread vesicular lesions 2-3 mm in width, especially on the facial region, and an eschar development on the supero-medial left thigh, left inguinal and supra-pubic areas in a diametrical area of 15 x 20 cm was also noted (Figure 1). Furthermore, a hyperaemic zone was detected around the eschar, extending throughout the infraumblical, right inguinal and left mid-thigh regions. Her laboratory findings

were Hb 10.7g/dl, Hct 32%, PNL 14100/mm^3, platelets 109000/mm^3, Na+ 137mEq/l, K+ 3.7 mEq/l and Ca++ 8.4mg/dl. In the a microscopic examination of fluids aspirated under the eschar, gram-positive stained diplococci were seen.

Immediately after the examination, based on the diagnosis of deep soft tissue infection, the patient was operated on under general anaesthesia for eschar debridement. During the course of the operation, necrotic tissues were encountered in the skin, subcutaneous tissues and deep fascia, displaying the characteristic dish-water appearance over the fascia. Necrotic tissue samples for a histopathological examination and microbic culture samples were also obtained from the wound. On the day following the operation, the health status of the patient quickly improved and the hyperaemic zone around the debrided eschar subsided. Additional treatment of the wound over the course of successive days entailed the administration of penicillin G, clindamycine and cephotaxime, including routine cleansing (Figure 1); on the 26th day following the primary operation a split thickness skin graft harvested from the right thigh was placed, whereupon the wound healed uneventfully.

Case 2

A 7 month-old girl developed skin eruptions a day after the appearance of lesions on her older sister, (Case 1), and she was treated with the same regiment for varicella. She had been admitted to the paediatric infectious disease department of our hospital together with her older sister for skin discoloration of the right inguinal region. When the patient was examined, similar eruptions to those found in Case 1 and, in addition, an eschar 7 x 7 cm in size were discovered on the right inguinal region (Figure 2). The general health status of the patient was poor, with preseptic signs. Laboratory findings were Hb 11.9g/dl, Hct 36%, PNL 12700/mm^3, platelets 410000/mm^3, Na+ 138mEq7l, K+ 4.7mEq/l, Ca++ 8.9mg/dl. Due to the seriousness of the patient's condition, immediate debridement of the eschar at the bedside was required. During the debridement procedure, necrosis of skin, subcutaneous tissues, and deep fascia, with the characteristic dish-water appearance of the wound, were encountered (Figure 2). Again, tissue samples for a histopathological examination and microbic samples were obtained from the wound. The patient's condition, under treatment with penicillin G, clindamycine, cefotaxime and acyclovir, quickly improved after debridement and the wound was closed with a partial thickness skin graft on the 21st day following the debridement operation (Figure 2). In this case, too, the patient recovered uneventfully.

The cultures obtained during the debridement yielded group A b-hemolytic Streptococcus (GABHS), and an active necrotizing inflammation

Figure 1A

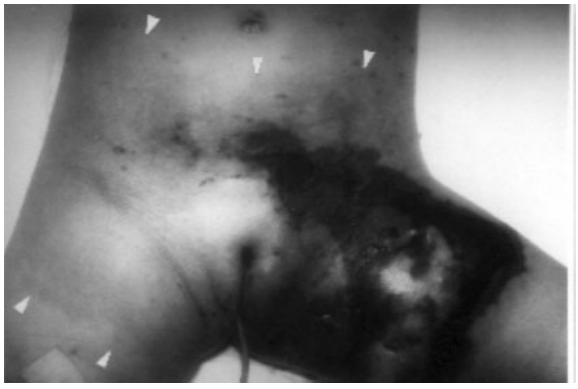

Figure 1B

Figure 1C

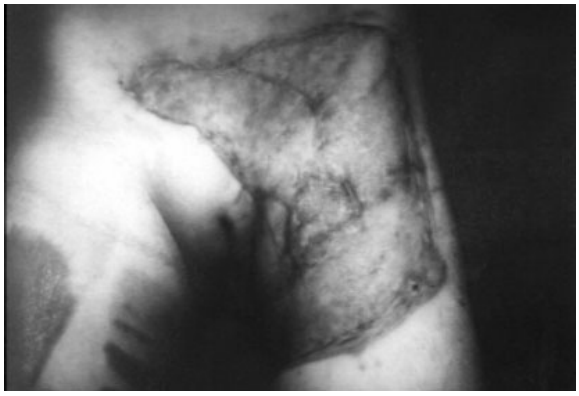

Figure 1D

Figure 1. A- *Skin eruptions of varicella on the facial region of Case 1.* **B-** *Necrotic area located on the left thigh, inguinal and pelvic areas. Margins of the hyperemic area surrounding the eschar are indicated by white arrowheads.* **C-** *The hyperemic zone regressed quickly after debridement. White arrowheads indicate former, and black arrowheads indicate new margins of hyperemia after debridement.* **D-** *Appearance after split thickness skin graft application in the first post-operative month.*

Figure 2A

Figure 2B

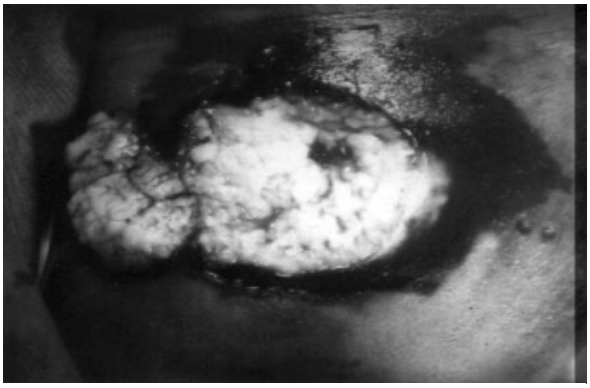

Figure 2C

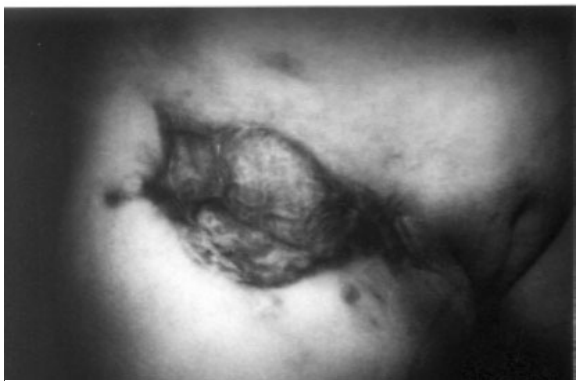

Figure 2D

Figure 2. A- *Skin eruptions of the varicella on the face of the patient in Case 2.* **B-** *Necrotic area located on the right inguinal region.* **C-** *Dish-water appearance of the wound during debridement.* **D-** *Appearance of the wound one month after skin graft procedure.*

was reported for the tissue samples in both cases. An additional immune panel study for both cases

revealed a normal range.

DISCUSSION

Varicella is a result of the contraction of the varicella zoster virus, which is highly contagious during childhood. Characteristically, prodrome is absent or very short in this disease, and itchy papulary, vesicular and pustular lesions occur simultaneously. In normal children, systemic-related and other serious complications of this benign disease are infrequent. However, in untreated children or adults who are immune deficient, the disease can lead to pneumonia and secondary fatal infections (2). Neutropenia, which can be found concomitantly with varicella, creates a susceptibility to secondary bacterial infections. So, under normal conditions, skin eruptions of the varicella typically heal spontaneously without any scarring or sequela formation; however, in the event of secondary infection of the eruptions, permanent scarring can occur (1).

In recent literature, an increasing number of reports of primary varicella complicated by serious secondary invasive infections with GABHS, including necrotizing fasciitis, have appeared (4,5,6). Concordant with these reports, varicella infection was postulated as the most important risk factor identified with the acquisition of invasive group A streptoccal infection among children (5).

Wilson et al. reported that hyponatremia and/or hypocalcemia can develop in varicella cases complicated by necrotizing fasciitis and propounded that the diagnosis of necrotizing fasciitis should be considered for any child with skin and soft tissue involvement who also has electrolyte abnormalities. Furthermore, Wilson et al. suggested that serum sodium and calcium concentrations should be monitored as an indicator for surgical evaluation. In the first case described in our report, hypocalcemia was determined. However, the second case revealed no signs of electrolyte imbalance. The smaller size of the necrotic area in the second case (relative to the first) may explain the lack of development of a similar electrolyte imbalance.

In every age group, necrotizing fasciitis is a serious disease evidenced by a high rate of mortality and morbidity, and therefore debridement of the necrotic tissues is the most life-saving intervention. Concordant with this prescription, our cases rapidly improved after the debridement procedures and the resultant post-operative appearances were aesthetically acceptable.

The cases presented here are relatively rare examples of necrotizing fasciitis developing secondary to varicella infection. However, there are some features of these cases worthy of note: 1) the fact of the patients being sisters, 2) the simultaneous development of the soft tissue necrosis and, 3) the similar placement of the necrosis in both cases. One possible explanation could be that the same virulent bacterial strain penetrated the skin barrier which had been impaired by varicella, leading to the development of necrotizing fasciitis in the sisters, who were living in the same environment. However, we could not find a satisfactory explanation for the appearance of the necrotizing soft tissue infections in similar bodily regions. A potential explanation could have been the use of traditional cloth diapers contaminated with the same bacterial strain, as contamination and transfer of bacteria could have occurred during washing, cleaning or drying of the diapers. However, to the detriment of this postulation, diapers were used only on the patient in Case 2 of this study, and furthermore they were of the disposable type. Another explanation could be the puncture of femoral vessels with a contaminated syringe during the initial preliminary examination. However, an investigation into the history of medical practice at that facility provided no basis upon which to support that hypothesis either.

In the early stages of the varicella cases presented in this paper, evidenced treatment entailed the administration of analgesics and antihistaminics. In the case of a life-threatening complication, such as necrotizing fasciitis secondary to varicella, the use

of appropriate antibiotics seems reasonable. Following the further development of any serious necrotizing soft tissue infection, prompt surgical intervention accompanied by antibiotherapy via penicillin and clindamycine, are life-saving approaches.

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