G Chir Vol. 32 - n. 8/9 - pp. 376-378
August-September 2011

Extensive facial trauma caused by dog bites in woman suffering from systemic fluconazole-resistant Candida infection

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SUMMARY: **Extensive facial trauma caused by dog bites in woman suffering from systemic fluconazole-resistant Candida infection.**

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Introduction. *Dog bites present a complex problem. Extensive facial trauma is a challenging problem to treat with priority for functional outcome. This paper describes the conservative treatment in a very difficult case of facial trauma with unusual infections due to the bites.*

Case report: *A 45 year-old woman was admitted in hypovolaemic shock with amputation of nose, upper and lower lips, left cheek and chin caused by dog bites. After vital parameters and volaemy were stabilized, wound toilet was performed, followed by skin and mucosal rotation flaps and anterior nasal tamponade; the lesion has then been covered with a collagen/oxidized regenerated cellulose dressing and sterile gauzes. Culture test highlighted coagulase-negative* Staphylococcus *and* Candida albicans. *However after few days, the patient developed septic-undulant hyperpyrexia, retinitis, renal candidiasis, folliculitis. Systemic Candida infection resistant to fluconazole was diagnosed. Amphotericin B was given to the patient and the facial wound was managed conservatively with an active medication because of inoperability conditions. The outcome of the use of active medications was an immediate response with excessive granulation tissue followed by a rapid re-epithelization.*

Conclusion. *As our case has shown, conservative treatment can be a valid alternative therapy in the treatment of large wounds with invasive candidosis and candidaemia or other major contraindications to surgery. In fact, in cases where surgical reconstruction is not a feasible option, conservative treatment can allow a rapid repair of the skin barrier.*

RIASSUNTO: **Grave amputazione del volto da morsi di cane in una donna con infezione sistemica da Candida fluconazolo-resistente.**

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Introduzione. *I morsi di cane rappresentano una problematica complessa. L'amputazione del volto comporta un difficoltoso management con priorità per il risultato funzionale. Il presente lavoro descrive un caso complesso con inusuale infezione da morso di cane.*

Caso clinico. *Una donna di 45 anni veniva ricoverata in shock ipovolemico con amputazione di naso, labbro superiore ed inferiore, guancia sinistra e mento da morsi di cane. Previa stabilizzazione dei parametri vitali e della volemia, eseguivamo toilette dell'ampia ferita, accostamento dei lembi cutanei e mucosi, tamponamento nasale anteriore, copertura mediante medicazione di collagene/cellulosa ossidata rigenerata e garze sterili. Test colturali mostravano presenza di Stafilococco coagulasi-negativo e* Candida albicans. *In breve tempo, la paziente sviluppava iperpiressia settica-ondulante, retinite, candidiasi renale, follicolite. Veniva posta diagnosi di infezione sistemica da Candida fluconazolo-resistente. Essendo la paziente inoperabile per le condizioni generali, sommistravamo amfotericina B e optavamo per un management conservativo per il volto con medicazione attiva. I principali risultati utilizzando una medicazione attiva sono stati: immediata risposta con ipergranulazione tissutale e successiva rapida riepitelizzazione.*

Conclusione. *Il management conservativo può rappresentare, come nel nostro caso, una valida alternativa nel trattamento di ampie ferite con candidiasi invasive e candidemie o altre maggiori controindicazioni alla chirurgia. Infatti, quando la ricostruzione chirurgica non è possibile, il trattamento conservativo può rapidamente portare verso la ricostituzione della barriera cutanea.*

KEY WORDS: Dog bite - Face amputation - Systemic Candida infection.
Morso di cane - Amputazione del volto - Candidosi sistemica.

Introduction

Dog bites to the face can cause severe soft tissue damage or amputation and may be life-threatening when major infection occurs. Traditional treatment consists of wound toilet and debridement; surgical repair is only considered when the possibility of infection has been ruled

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out. Surgical opinion is gradually shifting towards earlier repair (1). Immediate reconstruction of these injuries is frequently performed using local flaps and adjacent tissue transfer to close the defect, but these repairs frequently involve a permanent distortion of the local anatomy (2). In 2007, Dubernard et al reported the outcomes of partial face transplantation in a disfigured woman for whom conventional reconstruction was considered a poor option (3).

We report the case of a woman who was disfigured by several dog bites, that differ from the French case as she presented peculiar general conditions.

Case report

A 45 year-old woman was admitted to our Emergency Department with complete amputation of her distal nose, upper and lower lips, adjacent part of the left cheek, and chin caused by dog bites (Fig. 1). She had taken an excessive amount of antidepressants, benzodiazepines and alcohol, which resulted in vomiting and loss of consciousness. Her dog, that started licking her face to protect her from the vomit, ended up consuming the mixture and slowly began to devour her face.

The patient was admitted to the hospital in a state of hypovolaemic shock due to acute hemorrhage. On examination, she presented with altered mental status, blurred vision and sleepiness, tachycardia and tachypnoea, hypotension and oliguria.

The first intervention was to stabilize the vital parameters and to restore the blood volume. Afterwards, wound toilet and debridement as well as cutaneous and mucosal flaps and anterior nasal tamponade were performed; finally, the wound was medicated with a collagen/oxidized regenerated cellulose dressing (*Promogran prisma*®) and sterile gauzes. Before giving her antibiotics (Metronidazole and Amoxicillin-Clavulanate), a culture swab of the wound has been requested. Furthermore, antirabic and antitetanus immunization, as well as betamethasone and ketorolac tromethamine were given to the patient. The original plan was to postpone the facial reconstruction to better general conditions of the patient, so that an accurate and appropriate operation could take place. However after the results of the blood and culture tests and the hyperthermia, we had to change the plans. The blood test revealed severe thrombocytopenia, leukocytosis with 89% neutrophils, severe anemia, hyperglycemia, hypokalaemia. The cultures test highlighted the presence of type 1 coagulase negative *Staphylococcus* (resistant to: ampicillin/sulbactam, ciprofloxacin, clindamicin, eritromicin, gentamicin, imipenem, oxacillin, penicillin G) and type 1 *Candida albicans*. After a few days, the patient developed septic-undulant hyperthermia (max 39.5°C), reduction in vision, deterioration of renal function, and folliculitis of pubis, axilla and scalp associated with pain and itching. The fundus oculi test showed hyphas, therefore the diagnosis was consistent with *Candida retinitis*. The ultrasonography and urine cytology with periodic acid-Schiff stain showed renal candidiasis. Systemic Candida infection was diagnosed and fluconazole, nistatina, teicoplanin/levofloxacin were promptly given. Despite that, the fever persisted and the hemoculture was still positive for Candida, therefore we gathered that Candida was resistant to fluconazole. Amphotericin B was given to the patient that was then transferred to the Department of Infectious Diseases. The facial reconstruction was postponed and as a consequence the wound had to be managed conservatively. Every four days, complete wound detersion was performed and a new Promogran dressing was applied. This procedure was continued for one month. The results consisted in an immediate reaction of excessive granulation tissue formation, after the initial treatment (Fig. 2a); then, after a careful removal of the hypergranulation tissue, a rapid re-epithelization was observed (Fig. 2b). The result was functionally satisfactory, although from an aesthetic point of view it was far from optimal.

Fig. 1 - Disfiguration due to dog bites.

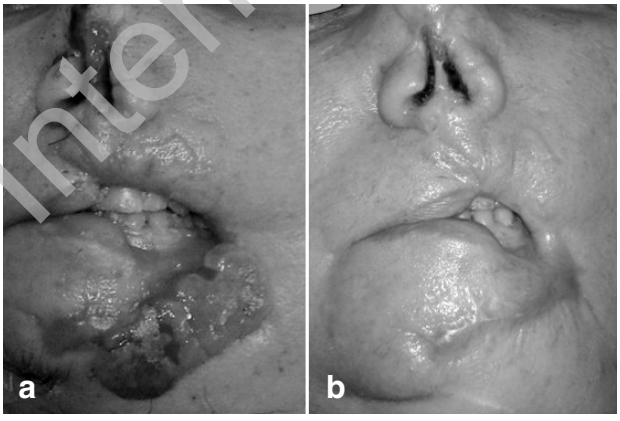

Fig. 2 - (a) Granulation tissue after treatment with active medications, and (b) subsequent epithelization.

Discussion

Dog bites represent a complex problem as well as a public health challenge (4). Clinical sequelae of bite injuries can extend far beyond simple wound management (5). In cases of extensive mutilating craniofacial trauma due to dog attacks, death may occur because of exsanguination, air embolism, and decapitation. Avulsion injuries with significant tissue loss represent the most difficult cases for definitive treatment (6). Traumatic amputation of the face is a challenging problem to treat with a main priority for functional outcomes (7, 8). Moreover, a very common complication of dog bites is infec-

tion, due to contamination of the wound by Gram-positive and Gram-negative microorganisms in the saliva (9, 10). The most frequently isolated bacteria are Klebsiella, Escherichia, Staphylococcus, Streptococci, Citrobacter, Enterobacter, Moraxella, Acinetobacter, and Pasteurella and anaerobes (11, 12). However, in our case Candida was the contaminant organism, causing locoregional and distant fluconazole-resistant candidosis. On account of this severe infection, the face reconstruction had to be postponed. The facial wound was conservatively treated using Promogran, a protease-modulating matrix of oxidized regenerated cellulose and collagen. The product is a sterile, freeze-dried matrix which, once the exudate has been absorbed, forms an adaptable gel which is in turn naturally re-absorbed by the body. It is able to bind and inactivate any existing excess proteases (matrix metalloproteinases, plasmin and elastase) and bind and protect growth factors from proteolytical degradation. When the product is re-absorbed, any growth factors that have been bound will be re-delivered in their active form (13). In this way, it creates an environment that promotes granulation tissue formation. In addition, this active medication has haemostatic properties (14). The benefits of the dressing are the fact that this product is re-absorbable; this results in the simplicity use, conservation and cost-efficiency.

Several studies have demonstrated that this treatment modality physically modifies the wound microenvironment, and thereby promotes granulation tissue formation and stimulates wound repair (15-18).

The original plan was to apply the collagen/oxidized regenerated cellulose dressing to the wound only as an adjuvant medication, waiting for reconstructive surgery. However, since the patient developed a systemic Candida infection, the facial reconstruction had to be postponed and the patient was treated conservatively. The conservative treatment showed good results from a functional point of view.

Conclusion

The consideration of this case suggests that conservative management with collagen/oxidized regenerated cellulose dressing may be an alternative therapy in the treatment of large wounds with invasive candidosis and candidaemia or other major complications to surgery.

We can affirm that in cases where surgical reconstruction is not a feasible option, conservative treatment can allow a rapid repair of the skin barrier.

The costs of active medications such as Promogran are low and their effectiveness high and, most importantly, they show good functional results. Although aesthetic results are not optimal, a secondary surgical revision can be planned as soon as patient's condition allow for this kind of operation.

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