

CERVICAL NECROTIZING FASCIITIS

G. Dimofte¹, Gabriela Lozneau¹, D. Pieptu², R. Moldovanu¹,
M. Danciu³, E. Târcoveanu¹

„Gr.T. Popa” University of Medicine and Pharmacy Iași, Romania

1 First Surgical Unit, „St. Spiridon” Hospital Iași

2 Department of Plastic Surgery, „St. John” Emergency Hospital Iași

3 Department of Pathology, „St. Spiridon” Hospital Iași

CERVICAL NECROTIZING FASCIITIS (Abstract): Cervical necrotizing fasciitis is an unusual encounter in the general surgical practice, but is a life-threatening condition requiring early recognition and adequate surgical treatment. We present the case of a 65 year old male patient referred to our department from a General Hospital. Large excisions of both superficial and deep cervical fascia were required together with necrotic skin on a very large surface. Rapid recovery with early sterilization allowed adequate skin grafting with good results. We advocate for aggressive debridement with excision in viable healthy tissue, with no concern for the future reconstruction followed by early grafting of the skin defect.

KEY WORDS: CERVICAL FASCIITIS NECROTIZING

Correspondence to: Gabriel Dimofte, MD, PhD, Assoc. Professor of Surgery, First Surgical Unit, „St. Spiridon” Hospital Iași; 700111, Independenței Street, No. 1, Iași, Romania; e-mail: gdimofte@yahoo.com

INTRODUCTION

Necrotizing fasciitis is a life threatening infection first described by Mehler with a recognized pattern of subcutaneous necrosis and progression [1]. Early diagnosis and early operation are accepted key points in successful treatment. Cervical origin of this subcutaneous spreading infection is infrequent and its development is determined by the complexity of anatomical planes of the neck and continuity with fascial planes of adjacent anatomical regions, notably thorax and mediastinum [2-6]. Most cases have a recognized odontogenic or pharyngeal origin. Idiopathic cases are not rare as aggressive broad spectrum antibiotic therapy may mask the primary site [5].

CASE PRESENTATION

Patient CA, a 65 years old farmer, was referred to our emergency department from a General Hospital with a suspicion of cervical gangrenous infection. The onset of the condition was sudden, 2 weeks before arrival in our department, with excruciating pain in the right cervical area accompanied by fever, chills and non-painful dysphagia that did not respond to oral antibiotics. As the general status and local symptoms progressed the patient was referred to a General Hospital for surgical evaluation. Marked edema developed on the right cervical area followed in 72 hours by a limited necrotic lesion in the suprasternal notch that spontaneously drained a foul aerated discharge. Necrotic tissue was excised and patient was referred to our hospital with suspicion of a cervical fasciitis.

* received date: 10.03.2009

accepted date: 25.04.2009

On presentation the patient had major pain in the right cervical area, subcutaneous edema and a skin defect in the suprasternal notch extending to the right supraclavicular region 10 cm x 6 cm. The wound appeared necrotic with a dark base and foul, aerated, frothy discharge. Skin over the entire cervical area and right thoracic wall appeared purple discolored, with marked edema. Palpation did not reveal gas in the subcutaneous tissue.

General status of the patient was not influenced but was obviously distressed. No other abnormalities could be identified either in clinical examination as well as lab work with the exception of a high WBC $15.8 \times 10^3/\text{dL}$. Urinary function was normal and a slight transient increase in glycemia (153 mg/dL) was not considered significant and subsequent values returned to normal.

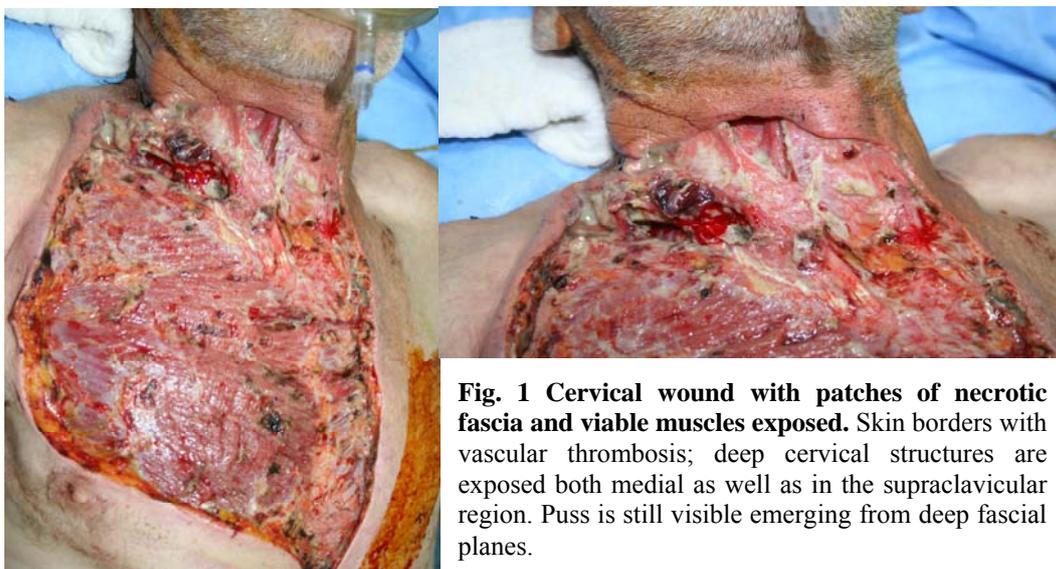


Fig. 1 Cervical wound with patches of necrotic fascia and viable muscles exposed. Skin borders with vascular thrombosis; deep cervical structures are exposed both medial as well as in the supraclavicular region. Puss is still visible emerging from deep fascial planes.

Emergency surgical debridement was indicated with a high suspicion of infection with gas producing bacteria. Initial evaluation proved to underestimate the extension of necrotic lesions which spread following fascial spaces in all neck compartments as well as most of the right thoracic wall. All structures components of the superficial and deep neck fascial planes were necrotic, but with viable pink muscular structures beneath. The sterno-mastoideus bundle was partially resected for a better access to the deep cervical structures. On the right side thoracic wall all structures starting with deep dermis to the fascia of the pectoralis major were affected by necrosis. Deep dermis both in the neck and thorax presented vascular thrombosis and did not bleed. Surgical strategy consisted in aggressive debridement of as much as possible of necrotic fascial structures and resection of all affected skin down to viable tissue. Muscular tissue was in general preserved. No attention was paid to cosmetic results and future reconstruction. Figure 1 depicts the general aspect of the wound after debridement and gives a general idea regarding the extent of infection and skin defect created surgically.

Soft gauges impregnated with betadine were placed in all spaces that have been developed and the whole wound was covered in betadine soaked dresses. Patient could be extubated immediately and was supervised in ICU for hemodynamic stability and parenteral nutrition.

Bacterial cultures from the wound showed a mixed flora with Gram positive cocci and diplococci, Gram negative sporulated bacilli. Penumococcus and Staphylococcus could be isolated and tested for antibiotic sensibility. Broad spectrum antibiotherapy was commenced with Teicoplanin as empirical therapy, followed by high dose Penicillin associated with Ciprofloxacin and Metronidazole for 5 days.

Pathological examination confirmed inflammation with tendency to abscess formation (Fig. 2A) that extended between viable muscular fibres (Fig. 2B). Fat tissue from the anterior thoracic wall shows massive lyponecrosis (Fig. 2C) with recent thrombosis of small vessels associated to inflammatory infiltrate (Fig. 2D).

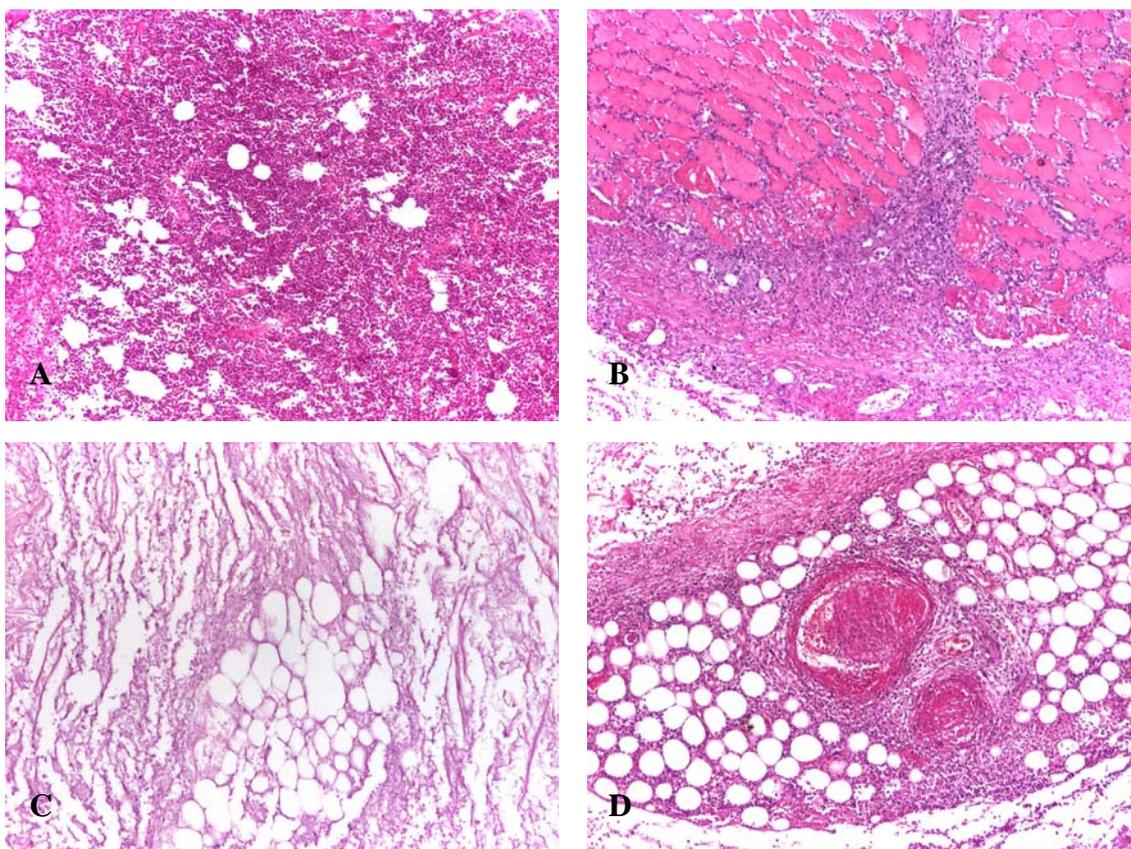


Fig. 2 Pathological examination

A Inflammatory infiltrate with abscess formation (HE x 4); B Inflammatory infiltrate dissecting viable striated muscle bundles (HE x 4); C Massive lyponecrosis (HE x 4); D Recent thrombosis surrounded by inflammation and fibrosis (HE x 4)

First two dressings were done under general anesthesia and limited excisions were required to ensure a complete debridment and offer conditions for rapid granulation. Nine days after the surgical debridment the wound was clean, with granulation tissue developing and feeling empty spaces and negative bacterial cultures.

Early grafting was decided and split thickness skin grafts were used to cover the major skin defects. All skin grafts survived and patient had a swift recovery being discharged after an additional postoperative week. Early postoperative functional results are very good with no limitations in movements, while cosmetic aspects are acceptable (Fig. 3).

DISCUSSIONS

Necrotizing fasciitis is an insidiously advancing soft tissue infection characterized by widespread fascial necrosis. Organisms spread from the subcutaneous tissue along the superficial and deep fascial planes, presumably facilitated by bacterial enzymes and toxins. This deep infection causes vascular occlusion, ischemia, and tissue necrosis. Superficial nerves are damaged, producing the characteristic localized anesthesia. Septicemia ensues with systemic toxicity [7].

In most cases aetiology is plurimicrobial (Type I necrotizing fasciitis) and this form may initially be mistaken for wound cellulitis more so when toxicity is not obvious [7,8]. Type II is a streptococcal infection also called „flesh eating infection” and type III is a gas gangrene with myonecrosis. The case presented in this paper was a typical type I infection with infection spreading on fascial planes and association with vascular thrombosis. As this situation almost always develops in a surgical wound it is a possible scenario that superinfection followed in an initial surgical wound.



Fig. 3 Cosmetic results one month after first surgical debridement

The key in management is early recognition and early debridement. Of course resuscitation is to be started immediately and empirical antibiotics commenced even before the first surgical gesture, with later tailoring according to in vitro testings. Aggressive surgery implies incisions to the deep fascia, that can reveal the presence of „murky dishwater fluid” in the wound [7,8]. It is essential to remove all non-viable tissue including fascia, without concern for further reconstruction. Repeated debridement is required as lesion may progress away from apparent viable limits of resection. Bleeding can be a problem mostly if associated with intravascular coagulation, but in most cases bleeding from small vessels is a sign of adequate resection. We wish to stress the significance of aggressive surgical approach of these cases that certainly contributed to an early recovery, although our initial evaluation of life prognosis was poor. If non-recognition of the condition is by far the most damaging mistake,

preserving non-viable structures for a future cosmetic result is responsible for continuous toxicity and infection progression beyond the healthy margins.

Non surgical management of deep cervical fascial infection emerges as a novel alternative but requires a close supervision and drainage of all abscesses [9]. As there is limited experience and no clear cut indications for such a conservative treatment we do advocate against such management except for well documented cases with limited extension. Cervical fasciitis is particularly difficult as it hits on the border of surgical specialties. Complex anatomy of the neck allows progression along superficial as well as deep fascial structures. Continuity of the neck fascia with mediastinum and thoracic wall structures favors progression towards this anatomic areas [4,9,10]. Appropriate surgical management of deep neck infections is predicated on a comprehensive understanding of the anatomy of the head and neck [10]. All infected spaces should be readily opened and drained. Fascial planes are defined, anatomical, potential spaces dictated by the connective tissue and surrounding musculature within the neck and mediastinum. Anatomical spaces within the neck include the sublingual, submental, submandibular, submasseteric, pterygomandibular/masticator, infratemporal/temporal, lateral and retropharyngeal, and prevertebral spaces, all of these interconnected [10]. One should take into account possible spreading to this spaces and the pictures we present clearly demonstrate the importance of adequately debridement fascia in this spaces. Reconstruction should be decided together by the surgeon in charge and the plastic surgeon but early grafting should be delayed until bacteriological eradication [8]. A good level of trust and communication between the two specialties will speed up the procedure.

CONCLUSIONS

The management of necrotizing fasciitis affecting cervical spaces continues to be a challenge and results depend a great deal on surgical skills and courage to insure an early aggressive debridement. Clinical examination, correct empiric antibiotic selection, and appropriate surgical intervention are the cornerstones of proper management of deep cervical infections.

REFERENCES

1. Meleney FL. Hemolytic Streptococcus Gangrene: Importance of early diagnosis and early operation. *J Am Med Assoc.* 1929; 92: 2009-2012.
2. Beck HJ, Salassa JK, McCaifrey TV, Hermans PE. Life-threatening soft-tissue infections of the neck. *Laryngoscope.* 1984; 94: 354-362.
3. Krespi YP, Lawson W, Blaugrund SM, Biller HF. Massive necrotizing infection of the neck. *Head Neck Surg.* 1981; 3: 475-481.
4. Morrow JS, Gianoli GJ. Craniocervical necrotizing fasciitis. *J La State Med Soc.* 1993; 145: 297-300.
5. Helmy AS, Salah MA, Nawara HA, Khataba A, Khalaf HA, El-Maguid N. Abd. Life-threatening cervical necrotizing fasciitis. *J R Coll Surg Edinb.* 1997; 42: 410-413.
6. Diaz Manzano JA, Cegarra Navarro MF, Medina Banegas A, Lopez Meseguer E. Diagnostico y tratamiento de la fascitis necrotizante cervical. Evolucion tras una angina de Ludwig. *An Otorrinolaringol Ibero Am.* 2006; 33(3): 317-322.
7. Schwartz RA, Kapila R. Necrotizing fasciitis. E-Medicine. 2009; [available online at <http://emedicine.medscape.com/article/1054438-overview>]
8. Hasham S, Mateucci P, Stanley PRW, Hart NB. Necrotizing fasciitis - Clinical review. *BMJ.* 2005; 330: 830-833.
9. Islam A, Oko M. Cervical necrotising fasciitis and descending mediastinitis secondary to unilateral tonsillitis: a case report. *Journal of Medical Case Reports.* 2008; 2: 368.
10. Miles BA, Myers L. Management of Deep Space Cervical Infection. The University of Texas Southwestern Medical Center at Dallas, 2009; [available online at <http://www8.utsouthwestern.edu/utsw/cda/dept28151/files/308663.html>]