



ELSEVIER



CASE REPORT

Abdominoplasty as an adjunct to the management of peri-Caesarian section necrotising fasciitis

H. Schumacher, H. Tehrani, M.S. Irwin, C.M. Malata*

Department of Plastic and Reconstructive Surgery, Addenbrooke's University Hospital, Cambridge, UK

Received 9 June 2004; accepted 1 November 2005

KEYWORDS

Necrotizing fasciitis;
Caesarian section;
Abdominoplasty;
Debridement;
Reconstruction

Summary Necrotising fasciitis is a rare but potentially lethal condition, often requiring extensive soft tissue debridement and complex reconstructive surgery. The disease has been noted to complicate Caesarian section wounds, and our department has recently managed three such patients. They all required extensive abdominal wall debridements which would traditionally be closed initially by split skin grafting. We report on the clinical course of three patients, two of whom had their defects closed successfully by abdominoplasty without recourse to initial skin grafting.

© 2007 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

Necrotizing fasciitis is a rare but serious condition with an incidence of 0.4 per 100 000 population and a 34% mortality.¹ The clinical picture was first described in 1871 by Joseph Jones,² a Confederate Army surgeon, referencing more than 2600 cases. It was Wilson, however, who gave the disease its name in 1952,³ recognising even at that early period that more than one particular microorganism may be accountable.

The first infective agent to be isolated from affected tissues was *beta haemolytic Streptococcus*,⁴ followed later by *haemolytic Staphylococcus* and many other microorganisms. In the majority of cases, however, the infection appears to be polymicrobial.^{5–7}

The characteristic feature of the disease is that it can affect the fascial plane in any anatomical region. The association of

necrotising fasciitis with Caesarean section was first described by Golde and Ledger in 1977.⁸ Since then Goepfert et al. have reported its incidence to be 1.8 per 1000 Caesarean deliveries, noting nine cases over an 8 year period,⁹ with Schorge et al. recording five cases over 15 years.¹⁰ These are further supported by anecdotal cases in the literature.^{8,12–15}

Our department has become involved in the reconstruction of three cases of abdominal necrotising fasciitis associated with Caesarian section, two of which had direct closure of their defects by advancement of the remaining abdominal skin, in an abdominoplasty-type fashion.

Case reports

Case 1

A 29-year-old lady had an emergency Caesarean section in the second stage of labour for failure to progress. There

* Corresponding author. Address: Department of Plastic Surgery, Box 186, Addenbrooke's Hospital, Hills Road, Cambridge CB2 2QQ, UK. Tel.: +44 1223 586672; fax: +44 1223 257177.

E-mail address: contact@charlesmalata.com (C.M. Malata).

were no intraoperative complications and following an uneventful recovery she was discharged home. One week after discharge she presented to hospital with abdominal pain, pyrexia and a discharging wound infection. Wound swab cultures grew *Streptococcus milleri* and mixed anaerobes while blood cultures yielded *Escherichia coli*. A repeat wound swab taken a few days later revealed the presence of coliforms and anaerobes, whilst the purulent wound discharge yielded gram positive organisms and *Pseudomonas*.

She developed an acute abdomen, prompting an exploratory laparotomy. This revealed purulent ascites, a perforated appendix, and necrotic lower abdominal tissue. The wound was debrided and the perforated appendix stump was oversewn. The peritoneal fluid showed gram positive cocci and mixed anaerobes on microbiological investigation.

The patient's general condition failed to improve (Fig. 1), and a CT scan performed 3 days later indicated extensive abdominal wall fasciitis (Fig. 2), requiring further extensive wound debridement of skin and fascia up to the umbilicus. Two days later the patient had a wound inspection and minor debridement by a visiting plastic surgeon (Fig. 3).

She was then transferred to the regional plastic surgery unit where she received intravenous vancomycin, ciprofloxacin, metronidazole and gentamicin on the recommendation of the microbiologists. The wound was then closed by rectus abdominis muscle approximation and mobilisation of the upper abdominal flap in an abdominoplasty-type fashion. She subsequently made an uneventful recovery, and was discharged 12 days later (Fig. 4).

Case 2

A 36-year-old gestational diabetic with a body mass index of 50 was admitted to the prenatal ward with rapidly spreading cellulitis of the anterior abdominal wall in the third trimester of pregnancy. Her past medical history included rheumatic fever as a child. She was commenced on intravenous benzylpenicillin and flucloxacillin. Clinical features were consistent with necrotising fasciitis, prompting emergency debridement in the form of an apronectomy, to allow an infection-free Caesarean section delivery of



Figure 1 Lower abdominal wall necrosis 3 days post laparotomy.

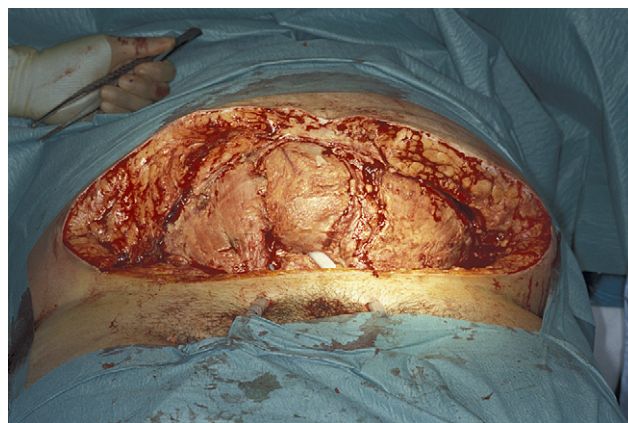


Figure 2 Skin, fat and fascia of the anterior abdominal wall debrided up to the umbilicus.

a healthy girl. The patient was transferred from the operating theatre to the intensive care unit. Preoperative swabs grew Group A *Streptococcus* and therefore histologically she had features consistent with lobular panniculitis. Intravenous benzylpenicillin and flucloxacillin were continued on microbiology advice.

A change of dressings under general anaesthesia 48 h later showed no evidence of residual infection or necrotic



Figure 3 Preoperative photograph prior to wound debridement on day 5.



Figure 4 Postoperative result.

tissues. Three days later the large infraumbilical abdominal defect was closed by an abdominoplasty-type advancement flap and the patient transferred to the plastic surgery ward.

She made an uneventful recovery and was discharged 10 days later on oral Aciclovir, Ciprofloxacin and Clindamicin antibiotics (Fig. 5).

Case 3

A 29-year-old lady with pre-eclampsia had a Caesarean section complicated by HELLP syndrome (Haemolysis Elevated Liver enzymes, and Low Platelet count) and acute renal failure. She developed a wound dehiscence associated with underlying haematoma, and was explored in theatre where extensive necrotic tissue was resected and the wound packed. She became pyrexial 24 h postoperatively and developed a mild leucocytosis and serosanguineous wound discharge, prompting the administration of intravenous vancomycin, cefuroxime and metronidazole on advice of the microbiologists. Two days later, the patient was returned to theatre for further wound debridement and change of dressings.

She remained pyrexial, however, and wound swabs grew moderate amounts of *Pseudomonas aeruginosa* and



Figure 5 Postoperative result.

methicillin resistant Staphylococcus aureus sensitive to ceftazidime. An abdominal CT scan showed a low density collection within the left rectus sheath and right subcutaneous lower abdominal tissue. Therefore the patient had further radical debridement of her abdominal wound, following which her pyrexia settled.

She was discharged home 2 weeks later with dressings to her open abdominal wound which was successfully split skin grafted 3 weeks later. She is currently awaiting abdominal scar revision by abdominoplasty-type advancement of the upper abdominal wall skin.

Discussion

Necrotising fasciitis, being a rapidly spreading and often fatal disease process, requires prompt surgical debridement and aggressive antibiotic therapy. Obesity has been indicated to be an important risk factor for the disease postpartum,¹⁶ which is supported by all three of our patients reported here. Regular further debridement is often necessary to ensure eradication of infection and/or non-viable tissue, while antibiotic treatment is adjusted according to microbiological findings. The resulting defects can often be extensive, and form a challenge to the reconstructive surgical team.

In order to achieve wound coverage, it is common practice to perform split thickness skin grafting of the defect in the first instance, followed at a later date by any further reconstructive procedures. This practice was adopted in case 3 in which recurrent infection precluded definitive closure of the defect, and a split skin graft was used to gain wound coverage whilst observing for any signs of infection recurrence.

The first two cases demonstrate how coverage of the abdominal wall defect can be achieved by abdominoplasty-type advancement flaps. The patients were felt to have had adequate debridement, and had closure delayed for a few days to ensure no symptoms or signs of infection were present. Following this hitherto unreported method of closure of their defects, the patients have remained asymptomatic and free of any complications.

The above three cases illustrate that when infection is felt to have been eradicated, advancement of the upper abdominal wall may be used primarily to close lower abdominal wounds after necrotising fasciitis, this being achieved within the original hospital admission with obvious logistical advantages.

References

1. Kaul R, McGeer A, Low DE, et al. Population-based surveillance for group A streptococcal necrotizing fasciitis: clinical features, prognostic indicators, and microbiologic analysis of 77 cases. *Am J Med* 1997;103:18–24.
2. Jones J. Progressive fascial necrosis. 1871.
3. Wilson B. Necrotizing fasciitis. *Am Surg* 1952;18:416–31.
4. Meleney FL. Hemolytic streptococcus gangrene. *Arch Surg* 1927;9:317.
5. Brook I. Aerobic and anaerobic microbiology of necrotizing fasciitis in children. *Pediatr Dermatol* 1996;13:281–4.
6. Singh G, Ray P, Sinha SK, et al. Bacteriology of necrotizing infections of soft tissues. *Aust N Z J Surg* 1996;66:747–50.

7. Tsai CC, Lin SD, Lai CS, et al. A clinical analysis of necrotizing fasciitis: a review of 54 cases. *Gaoxiong Yi Xue Ke Xue Za Zhi* 1995;11:673–7.
8. Golde S, Ledger WJ. Necrotizing fasciitis in postpartum patients. *Obstet Gynecol* 1977;50:670–3.
9. Goepfert AR, Guinn DA, Andrews WW, et al. Necrotizing fasciitis after cesarean delivery. *Obstet Gynecol* 1997;89:409–12.
10. Schorge JO, Granter SR, Lerner LH, et al. Postpartum and vulvar necrotizing fasciitis. Early clinical diagnosis and histopathologic correlation. *J Reprod Med* 1998;43:586–90.
12. Mathews MS, Raman A, Nair A. Nosocomial zygomycotic post-surgical necrotizing fasciitis in a healthy adult caused by *Apophysomyces elegans* in south India. *J Med Vet Mycol* 1997;35: 61–3.
13. Martinez Velasco IG, Plascencia Valadez V, Salinas Trevino J, et al. Tirado Saldivar A [Post-cesarean necrotizing fasciitis. Bacterial synergism, or mixed infection of the soft tissues?]. *Ginecol Obstet Mex* 1996;64:58–63 [Article in Spanish].
14. Krowlikowski A, Gowri V, Radha K. Necrotizing fasciitis of abdominal wall after cesarean section. *Saudi Med J* 2000;21: 399–400.
15. Poehlmann S, Varaklis K. Necrotizing fasciitis after delayed secondary wound closure and cesarean delivery. *Obstet Gynecol* 1997;90:704–5.
16. Gallup DG, Freedman MA, Meguiar RV, et al. Necrotizing fasciitis in gynecologic and obstetric patients: a surgical emergency. *Am J Obstet Gynecol* 2002;187:305–10 [discussion 310–11].

CLINICAL TIP

A simple digital symmetry assessment prior to incision in abdominal free flap surgery/abdominoplasty

The use of digital images in the pre and post-operative phases of plastic reconstructive and aesthetic surgery is crucial and fundamental to our clinical practice. Prior to surgery, our pre operative markings are crucial as placement of asymmetrical scars will become a permanent feature on the patients' body.

Unfortunately asymmetry of abdominal scars seems to be evident in many published series. Reasons for this asymmetry may be related to the positioning of the patient while marking (standing versus lying down) or the surgeon marking the patient from one side and leaning over to the opposite side creating a bias. Attempting to correct this Nishito suggested a somewhat cumbersome technique of attaching a laser pointer with tape to the side of a digital SLR camera.¹

We would like to introduce a simpler technique of assessing symmetry of the abdominal skin pre operative markings prior to starting for example breast reconstruction (DIEP/TRAM) or abdominoplasty procedures. Once the patient is placed on the operating table and is positioned according to the surgeons' preference the patients' markings can be photographed using either a digital camera with a swivel lens or LCD screen. (Fig. 1) These unique features, enables one to directly visualise the image on the camera screen while focusing the image centrally between umbilicus and pubis in the midline using the *auto focus feature*. The image is then easily viewed on the cameras screen where asymmetry is noted and can be easily corrected prior to incision.

Reference

1. Nishito R. A laser pointer to take accurate intra-operative photographs. *JPRAS* 2006;59:1474.

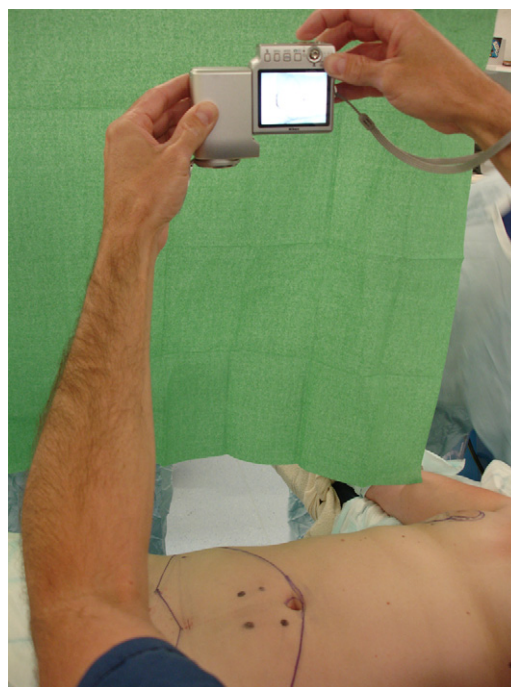


Figure 1 Pre operative image assessing symmetry.

Garrick A. Georgeu
Robert Caulfield
N. Niranjan
Broomfield Hospital, Court Road,
Broomfield, Chelmsford, Essex,
CM1 7ET, United Kingdom
E-mail address: ggeorgeu@ukonline.co.uk

© 2008 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

doi:10.1016/j.bjps.2008.03.002