RADIAL FOREARM FASCIOCUTANEOUS FREE FLAP AS A SOLUTION IN CASE OF NOMA

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The authors describe a case of Noma or Cancrum Oris, an oral gangrenous infection, features more frequently found in children from developing countries. The clinical features, its ethiopathogenesis, and its particular link with different geographic and economic areas of the world, its clinical evolution as well as surgical treatment are all discussed. Underlined is the functional and organic aspect of this disease, in particular the distortion of the face, which commonly involves the full thickness of the cheek skin and bone, mandibular ankylosis and craniofacial dysmorphisms, and the modern approach in reconstructive microsurgery. The authors report a case of a patient affected by Noma, with a very evident left face dysmorphism, where we found a brilliant solution using a left radial forearm fasciocutaneous free flap, appropriately shaped.

Noma is an oral gangrenous infection, which derives its name from the Greek verb *devour* and a synonym used frequently in Anglo-Saxon literature to describe this dreadful pathology, *Cancrum Oris.*1 Hippocrates2 and Galen3 are the first to describe this disease; then we had to wait until 1948 for a French paediatrician, Tourdes,4 to identify and summarize it. This pathology first appears in the oral mucous, and in only a few days can cause a total destruction of the soft tissue of the lips and cheeks and erosion of the bone; in some cases the necrosis can extend from the neck up to the eyelids. At one time from 80% to 90% of the young patients died in the acute phase of the illness from malnutrition, pulmonary problems, and septicaemia; at present this percentage has fallen to 10% to 20%.5 Survivors show constant organic and functional sequels—disfiguring scars, large loss of soft tissue in the cheek region, mandibular ankylosis, which all disable patients to eat—as well as maxillofacial deformation that compresses the airway, with consequent obstructive respiratory defects.

The chronic sequelae of the acute disease process often requires reconstructive surgery. Newborn and small children are mainly affected, although recently adults with immunitary defects have been reported, especially patients with different hemopathy such as leukemia, with consequent postchemotherapy aplasia,6 AIDS clinical patients,7,8 and patients with different infectious diseases, such as measles and malaria.9 Children are the most affected and development at the maxillofacial level, in these cases, is dismorphicenetic. Emiatrophy and severe dismorphism of the face are constantly present. This disease mostly affects malnourished children.10,11 It has a higher incidence in developing countries and above all in Africa and Asia: Somalia, Mozambique, Morocco, Algeria, Madagascar, Nigeria, Senegal, Vietnam, Nepal, India, and Cambodia.14 In Europe, the last documented cases are those after an epidemic of measles, in 1909–10 in Great Britain,15 and also in World War II prisoners released from German concentration camps.14 The conditions and factors that increase the risk of Noma are the following: populations who live in

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severe poverty, malnutrition, and low sanitary facilities and above all oral hygiene (weakling disease). Among the etiological hypotheses, the most credited is the infectious one and many types of bacterium have been considered: Fusiformis fusiformis, Borrelia vincenti, Bacterioides melanogenicus, and Pseudomonas aeruginosa. These microorganisms are saprophyte of the mouth and can cause an opportunistic infections only in populations with risk factors.15

It begins with a gingivitis lesion between the first and the second tooth that spreads to the cheek’s mucosa. Papulac ecchymosis and vesicles all come before the lesion; the symptoms are localized pain, scialorrhoea, bad breath, and edema of the cheeks. There is oral mucosa’s necrosis, which can spread to muscular tissue skin and bone, maximum the mandible, and the superior maxilla.16 Initially the therapy is medical with penicillin, macrolidi, tetracycline, cefalosporin, and metronidazolo. Medical therapy is supported by measures that decrease risk factors.17,18 Secondly, there is surgical therapy; we can carry a local flap, such as the nasolabial and the cheek flap, or a remote flap, such as the temporal flap and the deltopectoral flap.19 In our case we proceeded with a reconstruction using a radial forearm fasciocutaneous free flap made with two cutaneous islands.

**CASE REPORT**

M.K., a 12-year-old male born in the Ivory Coast, at the age of three contracted Noma and underwent no medical treatment. As the disease progressed, he had the loss of cheek tissue, a tongue prolapse, respiratory problems, infection, and maxillofacial dimorphism (Figs. 1 and 2). After a clinical study of the patient, we decided for surgical reconstruction of the lesion with a microvascular forearm radial flap, on account of thinning of the skin, long vascular peduncle, and the possibility to create two cutaneous islands of different dimensions. Surgically, after isolating the flaps and creating the two cutaneous islands of skin from the same (an area about 1.5 cm²), it is possible to suture the flap on all its parameter (Fig. 3). On one side is the oral mucosa and on the other side external skin of the cheek, so the facial defect is at once reconstructed. The antibrachial area from where we took the skin was repaired with a thin dermoepidermic graft.

We had technical difficulties choosing the vessel for the anastomosis of the limb; as a matter of fact we were unable to use a facial artery so we opted for a temporal artery in preauricular side homolateral. This artery was distant enough from inflammatory and fibrotic tissue and had a good blood supply. The vascular peduncle length necessary

Figure 1. Soft tissue defects and gross facial deformity due to Noma.

Figure 2. Destruction of the left cheek associated with tongue prolapse.
to make a microanastomosis was 10 cm, we made a termino-terminal anastomosis with a suture of radial comitans veins with the comitans veins temporal. The patient’s follow-up after 1 year showed good aesthetic and functional results (Figs. 4 and 5).

DISCUSSION

In this type of lesion where substance loss is very important, the vascular peduncle choice is very important; it had to be at a distance from pathological tissues of good quality and with a good blood supply. The facial artery with concurrent veins is next to the pathological tissue, but we were unable to use it because a Doppler exam showed a low blood perfusion, stenosis, and fibrosis of the arterial walls. For these reasons, the temporal artery with its veins, in preauricular side before it branch, remained the best vascular peduncle to use.

We chose the radial forearm fasciocutaneous free flap because its vascular peduncle also has a good length for making an anastomosis with the temporal artery. To improve the veins flow, it is possible to use the forearm cephalic vein, attaching it microsurgically on the flap, so as to ensure a cutaneous vein flow of return. In this case, we have to make a further venous anastomosis with compatibility of caliber, with the external jugular vein fortunately already rounded. The microsurgical techniques give a better aesthetic and functional result than those with traditional tech-
ntiques using local or tubular limbs. The advantage of microsurgery is that we can make a one-off reconstruction, with less costs and hospitalization time.

REFERENCES

2. Ippocrate. Liber de ulceribus, sec. 1.