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Post-burn popliteal fossa flexion contracture: our experience about a case in N'Djamena (Chad)

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Abstract

Introduction: The functional sequels of burns, including knee contracture, are common in children in southern countries due to very limited access to specialized care structures. The treatment is surgical, accompanied by physiotherapy to improve the functional result. **Case report:** We report the case of an 11-year-old female patient, admitted to the surgery department after three. She suffered from sequelae of thermal flame burn of the trunk and lower limbs. She was treated in a rural hospital, and the evolution was complicated by a contracture of the left popliteal fossa and incomplete healing of the wound. The treatment of the wound was done for thirty days, allowing for an optimal local condition. This was until the suppuration

completely stopped (after thirty days). Complete healing was not achieved but the wound was clean, and the C-Reactive Protein was normal. Surgery to release the flange was possible after two months. A plasty to release the flange was carried out eight weeks later by a “chevron” lengthening tenotomy of the hamstring muscles and transversal fascial incisions (to discharge the gastrocnemius muscles). **Conclusion:** A posterior femoropedious cast splint in extension was placed. Physiotherapy was started early, and a skin graft (thin and total) was performed eight weeks post-operatively. The evaluation at 18 months was good, with a slight limp when walking.

Keywords: Burn, popliteal fossa, contracture, surgery, Chad

Introduction

Burns cause numerous functional sequels, particularly at the joint and especially when they are poorly treated. Many improvements in their treatment have been made without, however, reducing their consequences in underdeveloped countries (Sankalé, 2010). These sequels are most often found in children (Barani, 2021; Richard-Kadio, 2000; Sankale-Diouf, 1999) with a significant proportion of retractile flange. In our resource-constrained contexts, initial burns or their sequels are often treated by unqualified personnel. Initial treatment in a specialized center would help avoid many of these complications, the treatment of which is complex and the follow-up more demanding.

We report the case of a young patient admitted to the surgery department of the University Hospital “Bon Samaritain” of N’Djamena for a popliteal fossa contracture.

Clinical case

An eleven old age patient, pupil, living with her parents, admitted for the sequels of a thermal flame burn to the left lower limb. The circumstances were a domestic accident that occurred three years earlier. The affected areas were the two lower limbs and the lower part of the trunk (on the left). She would have been initially treated in a rural hospital. The left lower limb evolved toward a popliteal fossa contracture and incomplete healing.

On admission, we noted good general condition and absolute functional impotence. She also presented dyschromic macules ranging from the distal third of the trunk to the distal third of the leg. We found a roughly triangular suppurative wound on three-quarters of the circumference of the left knee (except medially) (Fig.1&2). This was approximately three centimeters above the popliteal fossa contracture. Knee stiffness was at approximately 110 degrees of flexion. Ankle mobility was possible, distal

sensitivity and motor skills were preserved. Radiograph of the left knee did not reveal osteoarticular damage. The biological assessment was normal except the C-Reactive Protein (CRP), which was elevated (21 mg/L).

Figure 1: Condition of wound dressing and lateral knee x-ray on patient admission

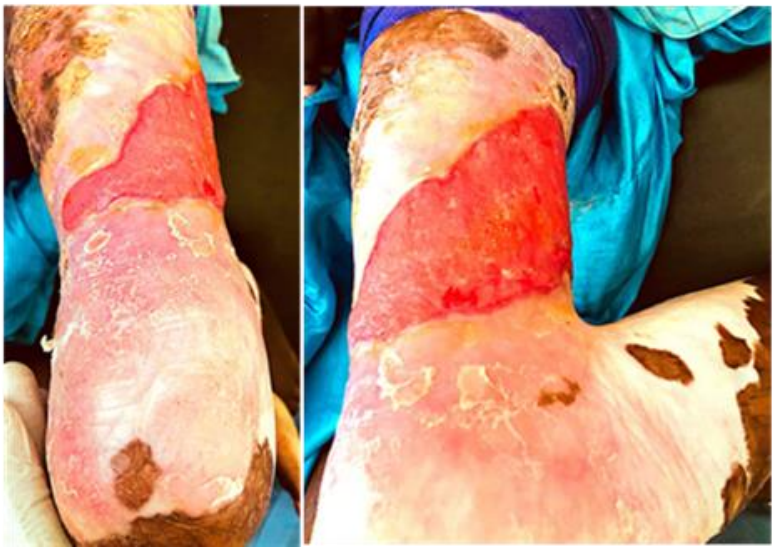

Figure 2: Condition of the wound after four weeks of local care. There is the presence of some fibrin deposits on the wound

Prior daily local treatment during ten days was done before continuing every three days. This was until the suppuration was completely stopped (after thirty days). Complete healing was not achieved, but the wound was clean and the CRP was normal (Fig.3). Surgery to release the flange was possible after two months.

Figure 3: Patient installation and wound condition which is clean on the day of surgery

Installation was in a supine position (general anesthesia), the left hip could be mobilized in all ranges (the tourniquet was not used) (Fig.3). We made two posterior transverse incisions: one, approximately three centimeters below the band and the other, above the distal limit of the wound described above. Release was achieved by progressive dissection and hemostasis. Another vertical incision centered on the retractile flange was subsequently necessary to dissect and secure the vascular-nervous elements. A manual knee liberation with release of the gastrocnemius helped to obtain an extension of -15 degrees (incomplete). This incomplete extension is relative to a brake induced by the hamstring muscles but also a slight tension in the gastrocnemius. A “chevron” lengthening tenotomy of the hamstring muscles as well as aponeurotic incisions to release the gastrocnemius muscles, was made. They help to obtain a complete extension (Fig.4A&B). The tendon continuity was restored using overlock stitches (with Vicryl 1). We then carried out an abundant washing with physiological serum followed by a few stitches to protect the vascular-nervous structures. The vertical incision was closed. A fatty dressing was made and a posterior cruropedious plaster in full extension was placed to immobilize the knee (Fig.4C).

Figure 4: Intraoperative images showing complete extension of the knee obtained after release (A&B) followed by immobilization with an extension cast splint (C).

The evolution was done by partial skin necrosis after three weeks, motivating necrosectomy. Removal of the plaster was possible after six weeks with immediate physiotherapy. Total skin graft was performed eight weeks postoperatively. The total skin was taken from the inguinal region bilaterally and placed preferentially at the popliteal fossa site. The sampling site of the thin skin was the opposite thigh to cover the remaining part. Approximately 90% of the graft was taken and complete healing was achieved after six weeks. The evaluation at 18 months post-operative noted: moderate pain when walking long distances or standing for a long time, walking with a slight steppage, normal active flexion-extension of the knee (Fig.5AB&C).

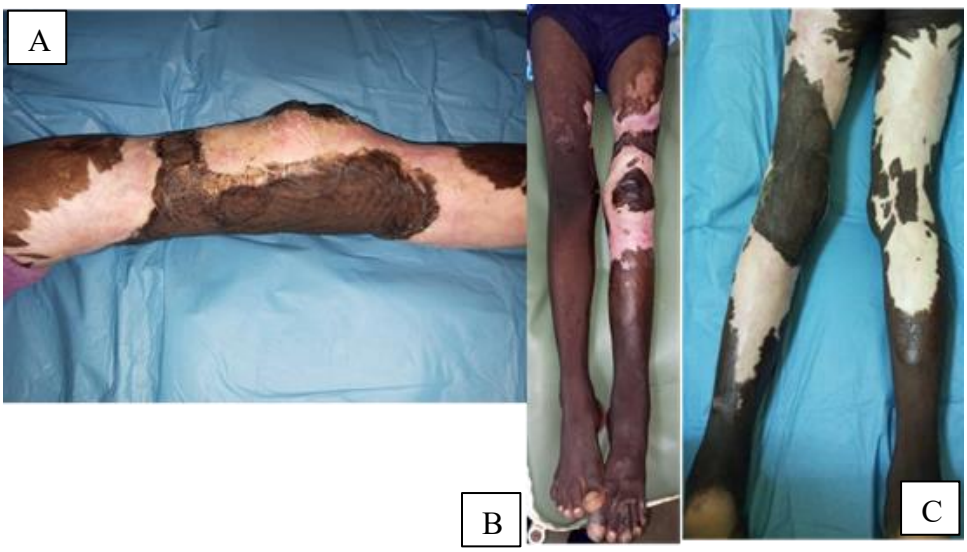

Figure 5: Images at 18 months post-operative: close-up view of the popliteal fossa (A); anterior and posterior view of pelvic limbs (B&C)

Discussion

Burns, particularly those of thermal origin by flame, are common in developing countries. Children represent the first victims by their proximity to mothers (who are most often in the kitchen) and the inattention of parents (Albertyn, 2006; Kibadi, 2015; Lordier, 1984) [4,5,6]. The circumstances are often a domestic accident, including gas cylinder explosions or flames which, through inattention, touch the clothes before spreading (as in this case) (Adendjingué, 2023; Boukind, 1994; Damien 2024; Hachicha, 2024).

For this case, the initial treatment concerned the wounds alone without thinking about the possible functional handicap. Early mobilization of joints, excision-skin grafting and the wearing of compressive garments[8] are not often known by many practitioners. In our case, the patient's parents were in financial difficulty and were unable to request treatment in a better-equipped center in the capital. Our countries do not always have a specialized center dedicated to burns, immediately compromising initial care and secondarily promoting the occurrence of sequels. The analgesic position of the flexed knee promotes the occurrence of contracture. Several techniques are described, including Z or trident plasty, transverse incisions in the retraction, or even the rail technique[9] (Abdellaoui, 2022)

Our technique is similar to that of Achbouk (2011), who also made two transverse incisions on either side of the flange, followed by manual release. This technique seems easier and more accessible but for this patient, the loss of skin substance imposed the limit of the proximal and middle incisions of the flange for better exposure. This last gesture could explain the

partial skin necrosis that occurred in this area. Some authors (Sankalé, 2010) realize a one-stage surgery with skin grafting, unlike us. The challenge is the extension of the knee. Like many authors (Adendjinguè, 2023; Sankalé, 2010; Waymack, 1988) immobilization in extension in our case associated with gentle mobilization of the knee help to obtain full extension and to guarantee the avoidance of a residual flexum or unwanted adhesions.

Conclusion

The treatment of burns requires specialized skills in order to avoid the occurrence a very disabling functional handicap. The treatment of initial lesions must be well codified and early to avoid after-effects, hence the need for appropriate training for caregivers. Promotion of specialized treatment centers is more than necessary.

Conflict of Interest: The authors reported no conflict of interest.

Data Availability: All data are included in the content of the paper.

Funding Statement: The authors did not obtain any funding for this research.

Declaration for Human Participants: This study complied with the ethical principles of Helsinki for medical research involving human subjects. We obtained informed consent from all our patients and authorization from the competent institutional body, the medical directorate of our Hospital.

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