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CASE REPORT
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Conservative Management of Wound Dehiscence Following Pediatric Cavus Foot Surgery: A Case Series

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Background: Cavus foot surgeries are relatively common procedures in pediatric orthopedics. Following surgery, the tensile forces exerted on the wound by the newly corrected foot may hinder soft tissue healing and lead to wound dehiscence. Treatments including skin grafting and other plastic surgery procedures have been described in order to manage this complication. However, the effectiveness of conservative treatment regimens in cases of large dehiscence of these wounds has not yet been reported.
Methods: The charts of 7 patients between the ages of 7 and 19 who had surgical correction of severe cavus deformity and who developed wound dehiscence postoperatively were reviewed. All patients were treated conservatively with regular cleaning with chlorhexedine and application of different ointments and dressings along with surgical debridements. Three patients also received antibiotics. The primary outcome was wound healing as documented by clinical notes and photographs.
Results: The treatment was successful in producing the desired outcome in all cases with no other systemic or wound complications developing. Complete wound healing was obtained within a median time of 6 months and 5 days of treatment without the need for skin grafting or other plastic surgery procedures.
Conclusions: In pediatric patients with wound dehiscence postcavus foot surgery, conservative management with minimal surgical debridement and regular cleaning and dressing of the wound is a viable treatment option that has been shown to be effective in 7 cases. It should be considered in such patients before proceeding to more invasive surgical treatment. *(Plast Reconstr Surg Glob Open 2015;3:e590; doi: 10.1097/GOX.0000000000000566; Published online 22 December 2015.)*

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Severe cavus foot deformities are a relatively common problem in pediatric orthopedics. Common causes include conditions like Charcot–Marie–Tooth, cerebral palsy, and poliomyelitis.[1]

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Fig. 1. Pre-operative picture of patient 2.

The treatment of this condition is often surgical. These corrective surgeries are typically composed of a number of procedures tailored to the individual case and often include a plantar fascial release to correct the elevation of the medial longitudinal arch.[2] These surgeries typically require an extensive medial incision as described by Turco[3] for resistant club feet. After surgery, certain inherent factors to these types of wounds seem to hinder healing. Furthermore, even when primary closure appears safe, it is still associated with frequent reports of extensive wound dehiscence. Invasive treatments such as full thickness skin grafts and rotational fasciocutaneous flaps have been used successfully to treat this complication.[4,5] However, conservative management is a valid treatment option, and its application has not previously been reported.

MATERIALS AND METHODS

We identified 7 pediatric patients who had undergone surgery for correction of cavus foot between 2008 and 2011 and progressed to a wound dehiscence postoperatively. In all cases, the wounds were treated conservatively without any reoperation. All patients were followed until complete wound healing and beyond.

Data concerning demographics were obtained, and data about the preoperative findings, the surgery, the observation of the complication, and postoperative course (including medical and nursing notes and procedure record) were obtained. Particular attention was paid to the time by which each wound was completely healed and the particular wound care regimen used in each case.

All patients also had sequential photographs to document their progress (see Figure, Supplemental Digital Content 1, which displays progression through treatment of patient 4. http://links.lww.com/PRSGO/A153). The primary outcome was complete wound healing. Secondary outcomes included the duration of follow-up of the dehiscence and the need for referral to another service.

RESULTS

The indications for surgery were increasing pain and difficulty wearing shoes in cavovarus feet with variable degrees of equines (Fig. 1). At least half had a rigid deformity. All of the surgeries involved an extensive medial incision from the first metatarsal to the medial malleolus. The operative time ranged from 1 hour 45 minutes to 5 hours 10 minutes, and the tourniquet time ranged from 1 hour 33 minutes to 3 hours 18 minutes. Hardware was used in 8 of the 9 surgeries, and all feet were immobilized in a below knee splint or cast which was changed at the first postoperative visit (Table 1).

The average duration from the date of surgery to the date at which the dehiscence of the medial incision was noticed was 30 days (Figs. 2, 3). The initial size of the dehiscence varied largely between a minimal area of 1.5×1.5 cm and a large area of 10×3.8 cm.

Table 1. Demographics and Healing Periods of Patients Treated Conservatively

Case/ Patient	Sex	Aetiology	Age at Time of Surgery	Side	Intraoperative Observation/ Complications	No. of Debridements	Use of VAC	Time to Wound Healing
1	F	Early myoclonic encephalopathy	7	R	—	2	–	6 mo and 4 d
			7	L	—	1	–	6 mo and 4 d
2	F	Idiopathic	8	R	Tight medial wound	1	–	3 mo and 13 d
			8	L	Sural nerve laceration	1	–	9 mo and 19 d
3	M	Steinert syndrome (MD 1)	8	R	—	0	–	5 mo and 10 d
4	M	Infantile CVAs	13	L	—	2	+	15 mo and 7 d
5	F	Diastematomyelia and sacral agenesis	15	L	—	2	+	4 mo and 24 d
6	M	Myelomeningocele and Arnold–Chiari III	16	L	Edge necrosis of medial wound	0	–	7 mo and 25 d
7	F	Charcot–Marie–Tooth	16	R	—	1	–	6 mo and 30 d

F, female; M, male; R, right; L, left; VAC, vacuum assisted closure; MD, muscular dystrophy; CVA, cerebrovascular accident.

The treatment regimen consisted of repeated surgical debridements as a first step. Enzymatic debridement with Santyl Collagenase (Healthpoint Biopharmaceuticals; Tex.) was performed twice daily until all necrotic tissue removed, and the wounds were covered with a dry dressing. Then, either a VAC dressing was applied when available or Intrasite gel (Smith & Nephew, London, United Kingdom), a hydrogel, was applied daily until the wounds were covered by healthy granulation tissue. The treatment was then continued with Acticoat (Smith & Nephew), a silver based dressing, changed once every 2 days. It is important to mention that the Acticoat dressing was applied to cover only 75% of the wound surface to spare the wound edges. When the wounds were almost closed, Polysporin ointment (Johnson & Johnson; New Brunswick, New Jersey) was applied weekly and covered with a dry dressing. Collagenase was introduced early in the treatment regimen, and saline was preferred to chlorhexidine for wound care.

VAC therapy was only used in 2 cases. In case 5, the dehiscence was observed 6 weeks postoperatively. The wound continued to progress, despite conservative management for 2 weeks; therefore, the patient was admitted for a 14-day course of continuous VAC therapy. When compared with the other cases, this was not only one of the fastest healing but also the most severe at onset (See Figure, Supplemental Digital Content 2, which displays progression through treatment of patient 5. http://links.lww.com/PRSGO/A154)

Complete wound healing was obtained in all cases as documented by the medical notes or by photographs. The length of time for complete wound healing ranged from 3 months and 13 days to 15 months and 7 days. The outcome was cosmetically very acceptable in all cases (Fig. 4).

The only referral to another service in this series occurred in case 1: the bilateral dehiscences were rapidly progressing, and cellulitis was suspected on one of the legs. The patient was admitted to plastic surgery and underwent an extensive debridement of both feet under anesthesia and was discharged after a course of IV antibiotics.

Fig. 2. Patient 4 at 1 month and 6 days postoperative.

DISCUSSION

The mechanical forces exerted on the wound by the newly corrected foot, the tightness of the sutures required to reapproximate the wound edges, and the pressure exerted by the cast postoperatively may hinder healing, ultimately leading to this complication. Other factors that may be considered are a poor nutritional status of the child, failure to achieve hemostasis with subsequent hematoma development, and excessive exudate from the wound.[8]

VAC would be an advisable adjunct in all cases to reduce healing time and labor intensiveness of follow-up, which is the major disadvantage of our treatment regimen.[6–8] However, the availability of home-VAC is often the limiting factor in using this.

Fig. 3. Patient 2 at 20 days postoperative for the right foot.

Fig. 4. Patient 2 at the 2 years follow-up for the right foot.

To avoid this complication, we propose the following: preoperative stretching by casting, avoiding prolonged soft tissue retraction intraoperatively, performing a gentle soft tissue dissection, avoiding prolonged tourniquet time beyond 90 minutes and avoiding excessive molding of the first postoperative cast.

Casting the foot in an uncorrected position was not an option in our series, as most cases required K-wires for fixation. Also, reports in the literature looking at correction of clubfoot suggest that this practice is likely to lead to a loss of correction.[3]

CONCLUSION

In pediatric patients with wound dehiscence postcavus foot surgery, conservative management with debridements, regular cleansing of the wound, application of various ointments and dressings, and VAC therapy when available is an effective treatment option. It is our experience that, given how alarming these wounds appear, surgeons often advocate for surgery with the goal of preventing infection from spreading from the wound bed and from unacceptable cosmesis developing from secondary healing of an extensive wound. However, we found, in this case series, that conservative management results in complete wound healing in a period of several months and produces excellent aesthetic results. Other methods that can be considered include applying a soft bandage instead of a cast postoperatively, performing a gradual surgical correction of the deformity, performing skin grafting or fasciocutaneous flap interposition as part of the initial surgery, or allowing for secondary closure of wounds that appear too tight at time of surgery.[9]

The disadvantages of our proposed approach are that it may delay the process of rehabilitation, requires a prolonged period of regular clinical follow-up, and presents a risk of spread of an infection from the wound. On the other hand, surgical options present the risks associated with increased operative time and donor site morbidity. Comparative studies would be required to further evaluate the cost effectiveness of either treatment options.

Given the complexity of these cases and the multiple treatment options available, early consultation with a plastic surgeon is recommended to weigh the risks and benefits of surgical and conservative treatment.

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