

Wound management in a case of an open amniotic band syndrome in a 31-week-old preterm baby

This is a case study of a 31-week-old preterm baby presented with severe amniotic band syndrome of the left leg at birth. Circumferential band with skin defect, exposing the subcutaneous tissue and periosteum of the left tibia was visible on the distal third of the left leg. The left dorsalis pedis artery and posterior tibialis artery pulsations were not palpable, but detectable with handheld Doppler ultrasound device. The capillary refilling time of the toes was good. While waiting for stabilisation of patient's condition due to the poor lung function, wound management played a role in this case to protect the exposed left tibia from dehydration and necrosis as well as prevention of infection via the skin defect. Wound closure of the left leg was successfully achieved in 18 days.

KEY WORDS

- ▶ Amniotic band syndrome
- ▶ Case study
- ▶ East Borneo
- ▶ Newborn

A baby boy was delivered at 31st gestational weeks in Sarawak General Hospital, East Borneo, with birth weight of 1.705kg. The APGAR score was good. There was a circumferential constriction band with skin defect, exposing the subcutaneous tissue layer and the anterior part of the tibial periosteum located at the distal third of the left leg. The baby had a mild talipes equinovarus deformity (previously known as club foot) below the band, a hyperpigmented patch of skin and oedema at the dorsum of the left foot (*Figure 1a, 1b*). The dorsalis pedis artery and posterior tibialis artery pulsations were not palpable but detectable with portable Doppler device and capillary refilling time was brisk (less than two seconds). Apart from the aforementioned deformity, there were multiple superficial bands over the left forearm and right leg. The left index, ring and little fingers were auto-amputated at the level of distal interphalangeal joint and the left middle finger was rudimentary — like a nub.

MATERNAL HISTORY

The 38-year-old mother is a Para 4 (given birth to 4th infant), with pregnancy-induced hypertension, which was diagnosed at around 23 weeks of gestation. She works as a clerk and does not smoke nor drink alcohol. There was no antenatal history of teratogenic drug exposure, i.e. agents that can

disturb the development of the embryo, severe illness, threatened abortion or trauma.

INVESTIGATION

An X-ray of left lower limb revealed a circumferential skin defect with bony indentation over the exposed tibia. A few strands of thread-like structures that were found intertwined around the finger stumps were sent for histopathological study. The results showed that the linear strips of tissue composed of acellular collagenous amniotic connective tissue were partly lined by amniotic epithelium, consisting of cuboidal (cube-like) to low-columnar cells. The features were compatible with amniotic band syndrome.

TREATMENT PLAN

In view of apnoea of the baby's prematurity and underlying congenital pneumonia, immediate surgical release could not be performed. The wounds were regularly dressed while waiting for the lung function to improve.

The skin defect was cleansed with normal saline during every dressing change. After cleansing, foam dressing was applied on the skin defect, and the semi-permeable film dressing as secondary dressing was applied using the 'sandwich' method. This method was utilised to prevent the constrictive effect of a conventional circumferential dressing to the affected

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limb. Initially, the dressing was changed daily due to large amount of exudate. At this period, the baby was fretful during every dressing session, probably due to the pain from the raw wound site. We used non-pharmacological methods to tackle the pain during dressing, such as:

- ▶▶ Changing the initial cleansing solution from sterile water to normal saline
- ▶▶ Minimising the elevation of the affected limb during dressing change
- ▶▶ Allowing only trained personnel to do the dressing.

After one week of dressing the wound, the exudate became minimal and granulation tissue appeared at the wound bed. We noticed that the baby became less fretful during dressing change after one week, presumably due to alleviation of pain as the wound granulated healthily (*Figure 2a, 2b*).

OUTCOME AND FOLLOW UP

Complete wound closure was achieved at day-18 of treatment (*Figure 3a, 3b, 3c*). A deep scar encircled the limb, and as a result of this, the appearance of the classic hourglass limb of constriction band syndrome. The osseous defect resolved after wound closure was achieved.

Surgical release of the band will be carried out once the child is fit for surgery.

DISCUSSION

The incidence of amniotic band syndrome in newborn is 0.1% (Greene, 1993). The aetiology of this syndrome is still unknown (Jaiman et al, 2009). However, many hypotheses were suggested, such as abnormal germinal disc development and traumatic disruption of membranes (Iqbal et al, 2017). Kino (1975) suggested three aetiologies of amniotic band syndrome after the clinical study and animal studies and concluded that this syndrome is not hereditary. The three aetiologies are:

- ▶▶ Extruterine traumatic injury
- ▶▶ Intrauterine traumatic injuries such as constriction by amniotic band and perforation of amnion
- ▶▶ Localised lesions of the fetal extremities such as endogenous tissue defects and circulatory disturbances and haemorrhage (Kino, 1975).

Patterson (1961) has classified the ring constriction into four groups, which are:

- ▶▶ Simple ring constrictions
- ▶▶ Ring constrictions accompanied by deformity of

the distal part with or without lymphoedema

- ▶▶ Ring constrictions accompanied by fusion of distal parts ranging from fenestrated or terminal syndactyly (also known as webbed) to “exogenous” syndactyly
- ▶▶ Intrauterine amputations (Patterson, 1961).

In this case, the severe constriction band occurred at the lower limb. The skin lesion was circumferential, involving deep structures, breaching the bone, with viable distal part of the left lower limb. While waiting for surgical invention, management of this skin defect is essential to prevent bone necrosis and wound infection. Indeed, it eases the handling of the patient and results in wound healing.

To our knowledge, amniotic band syndrome of the lower limb in newborns with circumferential skin defect and viable distal part of the limb are rare. Patterson described a similar case but did not elaborate further (Patterson, 1961). In our opinion, there was inadequate time for the skin defect to heal in-utero as the child was born prematurely. However, we are unable to determine whether the wound closure would be complete if the baby was born full-term.

CONCLUSION

Appropriate wound management can keep the exposed bony structure in a moist condition and prevent the invasion of pathogenic microorganisms into the wound.

CONSENT

The patient consent form for medical photography was adopted from the American College of Medical Genetics (Cunniff et al, 2000).

The medical photography consent was signed by patient's father. The parents have seen and read the manuscript and materials submitted. WUK

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Figure 1a and 1b (29/5/2017): Showing circumferential skin defect (1 cm in width) over the distal left leg, exposing the subcutaneous tissue and part of the anterior tibia. The toes were pink and foot was oedematous. The ankle was slightly in an inverted position.



Figure 2a and 2b (4/6/2017): Showing wrinkle signs at the foot. Level of exudate reduced and granulation tissue appeared at wound bed. There were no signs of infection observed.



Figure 3a, b and c (14/6/2017): Showing complete closure of wound.