Acquired Constriction Ring
A Case of Rubber Band Syndrome

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Abstract: Rubber band syndrome is a rare entity seen in younger children mainly in communities where rubber bands are worn around the wrist for decorative purposes. When the band is worn for a long duration, it burrows through the skin and soft tissues resulting in distal edema, loss of function, and even damage to the neurovascular structures. These symptoms are difficult to relate to this rare but typical condition. We report a case of a 2¾-year-old girl with the history of a linear circumferential scar at the right wrist combined with the limited use of a swollen hand for several weeks. The child was taken to surgery with the purpose to release the red, indurated scar and eliminate the lymphatic congestion. A rubber band was found lying in a plane superficial to the flexor tendons but had cut through the superficial branch of the radial nerve and partially through the abductor pollicis longus tendon. The band was removed and the lacerated structures were repaired. The child had excellent recovery postoperatively. The cardinal features of a linear constricting scar around the wrist in the presence of a swollen hand should always alert the clinician to the possibility of a forgotten band around the wrist, which might have burrowed into the soft tissues for a period. Early recognition may be important to prevent further damage of essential structures.

Key Words: rubber band, constriction sign, wrist

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CASE

A 2¾-year-old girl presented a history of a linear circumferential scar at the right wrist and limited use of the hand for several weeks. On questioning, the mother said that a bracelet worn on the wrist was torn off when the girl got stuck playing 6 weeks ago, resulting in a circumferential scar. The child was put on antibiotics (amoxicillin/clavulante) and scar ointment (diclofenac and methylprednisolon aceponat) for 10 days by a physician who had examined the child earlier. After stopping the antibiotics, the redness of the scar was increasing and a swelling of the hand was developing. As a result, the child was brought to our emergency department by her mother. On examination, the girl presented in good health (weight >97 percentile), she had no fever, lymphangitis, or lymphadenopathy. She showed a linear circumferential constriction mark on the right wrist, which was red and indurated (Figs. 1A,B). The hand was swollen and warm but no fluctuation could be elicited. Active finger movements were present. The capillary filling of the fingers was normal. Sensation was difficult to assess, but the child responded to painful and tactile stimuli. Routine blood tests were within the normal limits. The ultrasound examination, which was performed by the pediatrics radiologists, showed diffuse fluid in the subcutaneous tissue. Clinically, the picture reminded of a congenital constriction ring. Therefore, the child was taken to surgery under anesthesia with the purpose to release the scar and eliminate the lymphatic congestion. The scar was broken by multiple Z plasties. A rubber band was found lying in a plane superficial to the flexor tendons but had cut through the superficial branch of the radial nerve and partially through the abductor pollicis longus (APL) tendon (Fig. 2). The median nerve was constricted but without macroscopic damage. The band was removed and the lacerated structures were repaired. The wound healed within 4 weeks, and the child had excellent recovery postoperatively with full return of APL function and a symmetric hand grip of 1 kilopond at 3 months of follow-up (Fig. 3).

DISCUSSION

Rubber band syndrome is a rare condition seen in younger children mainly in communities where rubber bands are worn around the wrist for decorative purposes.[1–3] In some specific geographical regions, it is customary to tie a sacred thread on the wrist for religious purpose[4] or, sometimes, a rubber band is worn accidently as in our case. These bands are hidden in the wrist crease, especially in children with chubby hands and may be missed by the parents. The syndrome was first described by Hogeboom and Stephens in 1961,[5] and till to date, there are only a few more cases reported by different authors.[1–9] Arora and Agarwal,[4] and Agarwal et al[1,2] described the development of the condition. All reported cases occurred at an age between 1 and 4 years (mean, 2.5 years) where growth is rapid.[1,2,4,9] Due to the rapid growth, the band cuts through the soft tissue around the wrist. This gradual penetration is surprisingly painless and without early neurovascular symptoms.[1,4] As the skin epithelializes over the band, the band can become completely invisible. This slow tissue penetration and rapid healing allow the band to penetrate the tendons and the neurovascular structures and come to lie deep in them.

The clinical presentation is characterized by a thin linear scar and combined with a swollen but painless hand. The presentation can mimic a congenital constriction ring as in our case and also described by Kumar et al[6] who reported a case of constriction in the thigh due to a rubber band mimicking a congenital constriction ring. Some cases show a discharging sinus on aspect of the wrist crease. As described by Arora and Agarwal[4] in long-standing cases, the band may reach the bone producing a constriction sign on plain radiographs.

Ultrasound can be a useful investigation to localize the band. Although in our case, the ultrasound examination performed by the pediatric radiologists could not detect the thin foreign material.

Magnetic resonance imaging scan can be indicated to exclude infection disease and osteomyelitis especially in cases where a discharging sinus is present.[1]

If the presentation is more acute, a compartment syndrome has to be differentiated, and if confirmed, immediate treatment is indispensable. Rasool and Stathoulis[3] presented 2 cases of acute rubber band constriction at the wrist with the need of exploration, fasciotomy, and carpal tunnel release. Another acute case was reported by McIver and Gochman,[7] managed with inpatient

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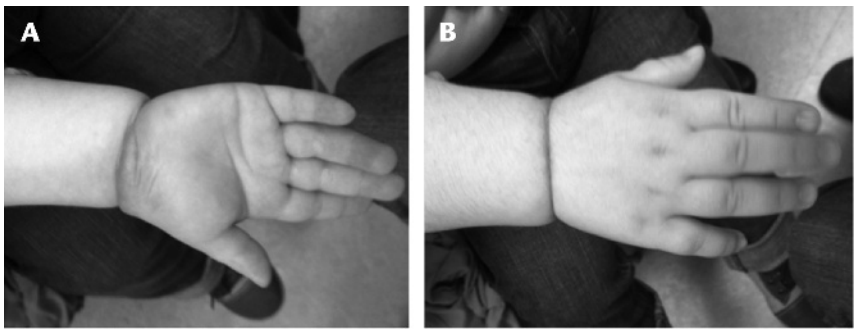

FIGURE 1 A, B. Clinical presentation with linear circumferential constriction mark and swelling of the hand.

FIGURE 2. Rubber band found superficial to the flexor tendons but cut through the superficial branch of the radial nerve and partially through the APL tendon.

observation and hand elevation. All these acute cases had a good functional outcome.

In rubber band syndrome, the therapy of choice is surgical treatment with removal of the rubber band as well as exploration and repair of the injured structures. With this treatment, reported cases in the literature show a good clinical outcome with 90% healing and full function.[1,2,4,9]

Due to possible child neglect, the involvement of child protect service has to be considered. In our case, there was no hint for child neglect. Parents unfortunately missed the accidently worn rubber band in the child's chubby wrist.

CONCLUSIONS

The cardinal features of a linear constricting scar around the wrist in a child of younger age mimicking a congenital constriction ring in the presence of a swollen hand should always alert the clinician to the possibility of a forgotten band around the wrist, which might have burrowed into the soft tissues for a period. Early recognition may be important to prevent further damage of essential structures.

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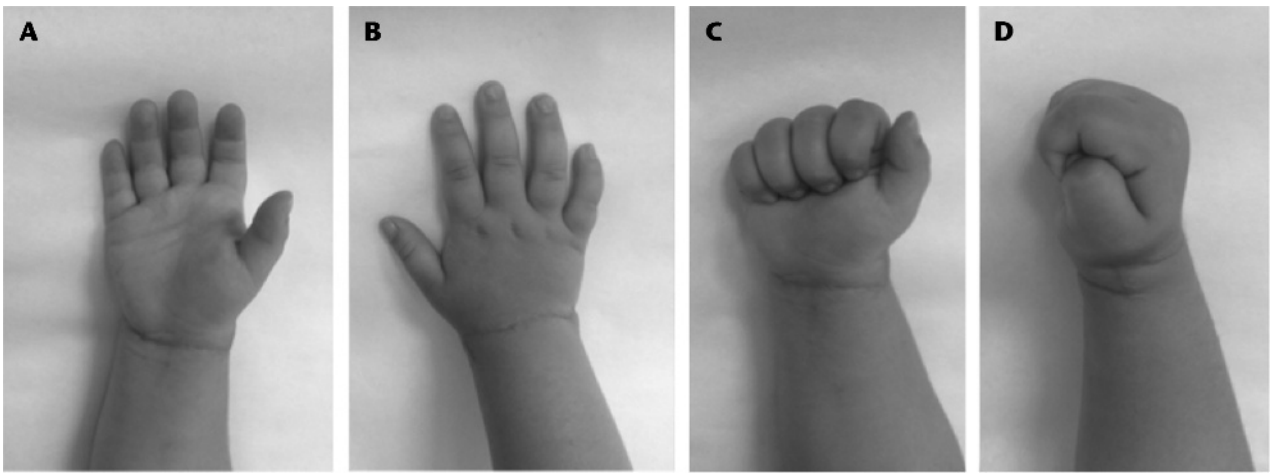

FIGURE 3. Outcome with excellent recovery postoperatively.

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