

A Case of Hair Thread Tourniquet Syndrome in a Neonate - Unusual Hand Injury Caused by Mittens

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Abstract

Hand injury secondary to mittens application have been reported since 1960s. A neonate was brought with history of bilateral hand swelling with dusky discoloration predominantly involving the right hand. Two mittens were worn in both hands and tightened at the wrist by elastic bands. Discoloration of the right hand with constriction mark at the wrist was noted. Hair thread tourniquet syndrome was suspected which is caused by hair or synthetic strands tightly wrapped around appendages. The underlying pathophysiology is impedance of lymphatic flow, venous outflow and/or arterial inflow obstruction. Treatment is prompt removal of the constricting substance with supportive care.

Key words: Hair thread tourniquet syndrome, Mittens, Hand injury in neonate.

Introduction

Hand injuries secondary to mittens application have been reported since 1960s [1]. Most of the cases reported are injuries limited to the fingers only & are variants of Hair-Thread Tourniquet Syndrome [2][3]. We report an unusual injury involving the entire hand in a neonate caused by mittens application. Fortunately the injury recovered within 2 weeks without subsequent tissue loss.

Case report

One 8 day old male neonate was brought with history of bilateral hand swelling with dusky discoloration predominantly involving the right hand. He was delivered by lower segment cesarean birth with uneventful antenatal history. On day 8 of life, the mother noticed that the neonate was crying ceaselessly and irritable. There were 2 mittens worn in both hands and tightened at the wrist by elastic bands to keep them in place. The exact timing of the mittens application was

unknown. On examination there was swelling associated with discoloration of the right hand with constriction mark present at the wrist. There was darkening of the palmar aspect & dorsum of the hand. Finger tips were dusky in colour. There were multiple blebs noticed more in the dorsal aspect. There was paucity of movements of the fingers with prolonged capillary refill time. On the left hand also there was a constriction mark with mild swelling associated with discoloration. Blebs were opened and antibiotic dressing was done. He was started on broad spectrum IV antibiotics and oral analgesics. Colour Doppler study of both upper limb arteries was done which showed normal colour flow signals and blood flow velocities. Periodic dressings of the hand was done. With above management, the swelling decreased gradually and the perfusion improved dramatically. The finger and hand movements were preserved altogether and the discoloration subsided at the end of second week.

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Figure 1: Baby on Admission



Figure 2: Left Hand Showing Constriction Band



Figure 3: Mittens with Elastic Band



Figure 4: Dorsal Aspect Showing Discoloration with Band Blebs and Constriction



Figure 5: During Recovery Stage



Figure 6: At Discharge, Ventral Aspect Showing Good Perfusion Of Digits

Discussion

Hair thread tourniquet syndrome is caused by hair or synthetic strands tightly wrapped around appendages causing constriction and damage. It can involve toes, fingers or genitalia [2,3]. Most of the cases reported are injuries limited to the fingers only. The underlying pathophysiology is impedance of lymphatic flow, venous outflow obstruction and arterial inflow obstruction in case of prolonged constriction. Treatment is prompt identification of the constricting substance and removal. Antibiotics and analgesics should be started. In case the distal part is unsalvageable, amputation should be considered [4]. There have been multiple case reports of mittens injuries [5-16][Table-1]. Majority of them occur in preterm babies as they have thinner subcutaneous fat and lesser tension can cause vascular compromise [5,11]. Reviewing the literature, the outcome of mittens injuries is variable with half of them requiring amputation of the distal unsalvageable part [15].

Table-1 Case reports of mitten injuries

Case	Yr	Reference	Age/Sex	Mitten	Duration	Constriction Site	Operation	Outcome	Others
1	1961	Mann ¹	5 wks/unknown	Cotton	—	Left middle finger	No	Loss of pulp and DIPJ extension	Preterm
2	1961	Mann ¹	3 wks/unknown	Nylon and wool	—	Right index finger	No	Loss of DIPJ extension	First child
3	1962	Bower and Woodward ⁵	—	Hand-knitted wool	—	—	No	Loss of finger tip	Preterm
4	1962	Bower and Woodward ⁵	—	Hand-knitted wool	—	—	No	Recovery	Preterm
5	1962	Bower and Woodward ⁵	—	Hand-knitted wool	—	—	No	Recovery	Preterm
6	1962	MacLean ⁶	6 wks/male infant	Nylon and wool	—	Right index finger	No	Abnormal nail growth	—
7	1965	Long ⁷	5 wks/male infant	Wool	Overnight	Left index finger	No	Recovery	First child
8	1967	Long ⁷	11 wks/male infant	Wool	36 h	Right index finger	Debridement	Recovery	First child
9	1967	Noott ⁸	7 d/unknown	Nylon	—	DIPJ, one middle finger	No	—	—
10	1972	Chan and Wong ⁹	3 d/male neonate	Wool	—	—	No	Recovery	—
11	1972	Chan and Wong ⁹	Unknown/male	Brocade	Overnight	Right index finger	No	Loss of distal phalanx	Preterm
12	1972	Hack and Brish ¹⁰	3 wks/unknown	Wool	—	Right index finger	No	Recovery	Preterm
13	1973	Tulloch ¹¹	1 mo/male infant	Nylon	24 h	Tips of bilateral index fingers and right middle finger	No	Loss of 2 fingertips and one finger recovered	Preterm
14	1986	Matthews ¹²	5 wks/female infant	Unknown materials, knitted	Overnight	Left index finger	No	Loss of fingertip	—
15	1996	Stringer and Seymour ¹³	10 d/female neonate	Wool	—	Left index and middle finger	No	Loss of middle finger tip	Twin girl, preterm
16	1996	Stringer and Seymour ¹³	3 wks/male neonate	Wool	—	Right index finger	No	Loss of whole terminal phalanx	—
17	1996	Stringer and Seymour ¹³	12 wks/male infant	Acrylic	—	Right index finger	No	Recovery	Parental nutrition
18	1977	Vandor ¹⁴	6 wks/female infant	Wool	3 d	Left index finger	No	Amputation at DIPJ	—
19	1982	Rork et al ¹⁵	3 wks/male neonate	Unknown	—	Right index finger	Debridement and DIPJ amputation	Amputation at DIPJ	—
20	2006	Sun	3 d/female neonate	Wool	—	Bilateral hands	No	Recovery	—

DIPJ indicates distal interphalangeal joint.

Parental education about mittens injury is a must and they should regularly examine the extremities to allow early diagnosis and prompt management. Practice of using additional constriction band around the wrist must be avoided. Finally Prevention is the best management.

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