19-Month-Old Male Presenting with Near Strangulation by Human Hair
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ABSTRACT
Hair tourniquet syndrome is a well-documented phenomenon in which hair can become tightly wrapped around an appendage resulting in ischemic injury and necrosis. When a hair tourniquet involves the neck as the appendage, fatality can result due to asphyxia, specifically strangulation. We present a case of accidental strangulation via hair tourniquet in a toddler who was found co-sleeping with his sister.

A nineteen-month-old male was brought into the emergency department via ambulance after an episode of apnea and cyanosis. On the night of admission, his parents awoke after they heard the patient’s sister screaming. The parents ran into the bedroom, where the patient and his five-year-old sister were co-sleeping, to find the patient cyanotic with loss of consciousness. EMS was called and patient regained consciousness without intervention by EMS. Vital signs were stable upon presentation to the ED. On physical examination, a linear circumferential mark on the patient’s neck was noted as well as scattered petechiae on his cheeks. X-ray of his neck revealed hypopharyngeal dilatation. Liver enzymes were normal. Skeletal survey and Doppler studies of neck vasculature were normal. Child protective services and law enforcement were notified. Upon investigation, the sister’s hair was confirmed to be at the level of the sacrum, with pieces of hair missing, which were found near the bed where the patient and his sister were sleeping. The case was deemed an accident and the patient was discharged home to his family.

Given the rare presentation in this case, it is essential to consider child abuse as a differential and involve law enforcement agents and/or child protective services to confirm scene investigation is consistent with the history provided to the medical team. In addition, consultation by the child abuse pediatrician was initiated and a skeletal survey was performed, which was negative for additional injury.

Keywords: Strangulation; Child Abuse; Co-Sleeping; Hair Tourniquet

INTRODUCTION
Hair tourniquet syndrome is a well-documented phenomenon in which hair can become tightly wrapped around an appendage resulting in ischemic injury and possible necrosis [1]. It is essential to intervene promptly in such cases in order to prevent damage and complications [2]. When a hair tourniquet involves the neck as the appendage, fatality can result due to asphyxia, and more specifically strangulation. Asphyxia, or the deprivation of oxygen, may be the result of strangulation, suffocation, or choking. Strangulation results from external pressure to the neck, which ultimately causes an obstruction to blood flow to the brain. Strangulation can be fatal, and death can result within minutes. In cases of asphyxia, it is important to consider child abuse as part of the differential [2].

Suffocation is an external process that deprives an individual of oxygen, resulting in asphyxia. In the pediatric population, suffocation is a concern when assessing the sleep of newborns and infants. There are inherent dangers of co-sleeping that are routinely discussed during pediatric office visits, particularly about newborns. There is the danger that during co-sleeping a parent may inadvertently roll over on top of a small child and unintentionally suffocate him/her. Parents are alerted to the risks of suffocation exist with overlay, wedging, chords near the bed, large plush stuffed animals, and heavy blankets and pillows.

We present a case of accidental strangulation via hair tourniquet in a toddler who was found co-sleeping with his older sister.

CASE PRESENTATION
A nineteen month old male with no significant past medical history was brought into the emergency room by ambulance after an episode of apnea and cyanosis. As per the patient’s mother, the patient sleeps in the same bed as his five-year-old sister. On the night of admission, the parents awoke after they heard the patient’s...
sister screaming. The parents ran into the bedroom to find the patient turning blue with loss of consciousness. They noted that the sister’s hair had wrapped around his neck. Of note, the sister’s hair was significantly long and thick, ending at the level of her sacrum. The sister was pulling her hair, trying to free the patient, however this resulted in the tightening of her hair around his neck. The mother frantically cut the hair after failed attempts to untie it. The mother states she delivered several rescue breaths when the patient regained color and consciousness. EMS was called and the patient was brought to the emergency department. On further discussion with mother, she reported that the patient plays with this sister’s hair as a self-soothing mechanism at baseline. She disclosed that the patient would wrap both his mother and sister’s hair around him when he slept with them.

In the emergency department, the patient was initially tachycardic and tachypnic, but subsequently stabilized with vital signs of temperature 97.9°F, heart rate 103-160 beats per minute, respiratory rate 26-34 breaths per minute, and pulse oximetry of 96%-98% on room air. On physical exam, the patient was developmentally appropriate, alert, and responsive. He had a well-delineated erythematous linear mark around his neck, with scattered pinpoint petechiae on bilateral cheeks (Figure 1). There was no noted hoarseness of voice or difficulty swallowing. The exam was otherwise unremarkable. His chest x-ray was normal (Figure 2). X-ray of his neck soft tissue (Figure 3a). X-ray of his neck revealed an incidental finding of hypopharyngeal dilatation (Figure 3b). The trauma team and child abuse specialist were consulted and the patient was admitted to the inpatient pediatrics unit for monitoring of cardiopulmonary status.

Liver enzymes were normal for age, AST 67 (nl: 9-80 IU/L) and ALT 15 (nl: 5-45 IU/L). Skeletal survey was normal, with no evidence of previous or acute fractures. Doppler studies of neck vasculature showed patent bilateral common carotid arteries and internal jugular vein. There was no evidence of common carotid arterial dissection.

Child protective services and law enforcement were notified given the patient’s near fatality. Upon investigation, the sister’s hair was confirmed to be at the level of her sacrum, with pieces of her hair missing. Those pieces of hair were found near the bed where the patient and his sister were sleeping. The case was deemed an accident and the patient was discharged home to his family.

**DISCUSSION**

Hair tourniquet syndrome is classically described as involving appendages such as the fingers and toes [3]. Such cases have been
Previous publications have described certain cultural practices where hair tourniquets are customary and therefore emphasized the importance of understanding the risks associated with such practices and sharing this information with the families of patients who may be at risk for harm due to these practices [1,2]. There have also been cases that have described hair-thread tourniquet syndrome in children with intellectual disabilities and/or autism spectrum disorder. One case was of a 14-year-old female with autism who was found to have hair-thread tourniquet of a cyst on her labia major, it was reported that physicians should be cautious in automatically deeming all cases of hair tourniquet as forms of child abuse as there may be accidental cases [1]. Based on these cases, it is clear that thorough history taking must be used in determining the etiology of hair tourniquet syndrome in pediatric patients.

Most documented cases of hair tourniquet syndrome have involved the appendages and genitalia; hair tourniquets have rarely been documented as causing strangulation of the neck. A case of accidental neck strangulation of a child was reported in 1978, in which a child was strangled by his mother’s unbraided hair during co-sleeping [4]. There has been only one case reported of neck strangulation by hair of sibling. In 2005, Chegwidden et al. published a case of an 11-month-old girl who suffered from near strangulation as a result of hair tourniquet syndrome when co-sleeping with her five-year-old sister [5].

There are various vessels that may become compromised as a result of strangulation, most commonly the carotid artery or the jugular vein. If the carotid artery or jugular vein becomes compromised, patients may become unconscious and ultimately suffer from complications of cerebral hypoxemia and even death. Occlusion of the jugular vein also results in the development of petechiae secondary to the increased pressure in the brain as deoxygenated blood builds up. The patient in our case did present with petechiae, which suggests that the mechanism of his injury was likely due to venous compression caused by the hair tourniquet.

Differentiation of cases of accidental versus abusive strangulation poses significant challenges clinically. Often, the cases can present similarly and detailed history and scene analysis can allow for discernment. Ultimately, this case was deemed an accident. This determination was made based on a history that was consistent with the patient’s presentation and was further corroborated by the home investigation. Upon interviewing the patient and his family, he was seen to utilize hair to self soothe, such as kissing his mother’s hair. This matched the mother’s claim that the child uses hair as a coping mechanism.

In this case, the question of safe sleep arises. The American Academy of Pediatrics (AAP) has clear recommendations regarding safe sleep practices. Emphasis has largely been placed on “back to sleep” initiatives in order to prevent Sudden Infant Death Syndrome (SIDS). More than 90% of patients who suffer from SIDS are less than six months of age [6]. In such cases, investigative efforts are limited; there is often no outward injury and only a small fraction of the autopsies performed yield an etiology for the presentation [7]. The AAP also offers guidelines regarding co-sleeping and recommend room sharing without bed sharing [8-10]. Oftentimes pediatrics are focused on the dangers of parents sleeping in the same bed as their child and there are no specific guidelines in place regarding siblings and co-sleeping. Future research and recommendations should be geared towards assessing the safety of co-sleeping among siblings. Preventative strategies would be best outlined by the AAP for pediatricians to recommend to their patients and their families.

Pediatricians should consider including counseling regarding the sleeping practices of siblings within their anticipatory guidance. Furthermore, anticipatory guidance must be tailored to specific familial situations and factors such as socioeconomic status and cultural practices should be considered when providing guidance to families. For example, for families who are limited by space and only have a single bed for all their children to share, it would be helpful to simply discourage co-sleeping. Instead, it would be helpful to share safety techniques that could decrease the risk of morbidity from co-sleeping in situations where it simply cannot be avoided. In this case, the dangers of co-sleeping among siblings needed to be considered. It was recommended that the siblings should sleep in separate spaces, however if sleeping together were to occur, the recommendation was provided to secure the sibling’s hair while the two shared the same bed to sleep. Future directions for research could include the assessment of age and weight parameters of children to see if they play a role in determining which factors should be considered when making recommendations for co-sleeping.

It is essential for health care providers to ask critical questions that allow them to ascertain the nature of an injury and determine whether or not the mechanism described in the history would result in the extent of injury caused to the patient. Providers should maintain a higher index of suspicion in cases involving nonverbal children. Physical examination and any laboratory studies and/or radiologic imaging should also be representative of the mechanism of injury described. If there is concern about the nature of the injury, child protective services should be notified in order to ensure the patient’s safety.

CONCLUSION

Here, we present a case where a hair tourniquet resulted in near strangulation of a toddler. Given this unique presentation, it is essential to consider child abuse as a differential and involving child protective services in similar cases. The mechanism of injury should be consistent with the presentation of the patient. It is essential for the provider to get a thorough history and involve law enforcement agents or child protective services to confirm scene investigation matches the history provided to medical providers.

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