

## Case Report

# Cervical laceration courtesy, the unbreakable kite string: case report

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## ABSTRACT

Kite flying is a sporting activity in Indian subcontinent and winters is the time of the year when rooftops are crowded and all eyes are towards the sky. The traditional glass spiked cotton threads made kite string Indian manja has been superseded by the inexpensive strong synthetic nonbiodegradable Chinese manja. This unstretchable and unbreakable string is fraught with life threatening primary and secondary impact kite string injuries. The kite-flyers themselves, the kite catchers, assistants, two-wheelers, drivers, pillion riders as well as, the pedestrians are the victims. We present a unique patient, who sustained a primary cervical injury with extensive laceration and tearing of the external jugular vein.

**Keywords:** Kite string, Penetrating trauma, Manja, Chinese dor, Neck vessels, Neck zones

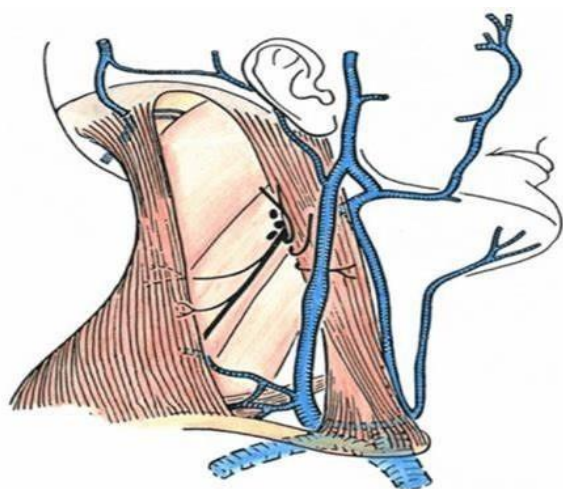
## INTRODUCTION

Onset of winter in the Indian subcontinent is accompanied by involvement in leisure as well as a sporting competitive activity of flying kites from the roof tops.<sup>1</sup> Frequently kites whose strings are cut during the aggressive flying duels, float down with their strings trailing behind. These razor sharp strings get entangled around poles, trees, buildings, standing vehicles and obstruct pedestrian and vehicular movement. As these abrasive kite strings are entangled at one end, the middle part becomes a ferocious weapon, akin to the garotte wire of the Spanish underworld. Individuals on foot or on two wheelers suddenly encounter this thin string which is knife sharp, if smeared with glass coating or maybe unbreakable if of a certain plastic type make. The latter marketed as the Chinese dor or string in our country. Human tissues sustain sharp injuries and even get severed off. The head, neck, torso and the limbs maybe

vulnerable to this type of trauma. In the cervical region, the external jugular on the lateral aspect and the anterior jugular vein on the anterior aspect, being superficial are quite vulnerable to this string trauma. A unique case of neck and hand injury due to kite string is being reported (Figure 1).

## CASE REPORT

A 62 year old gentleman was admitted with profuse bleed in the otorhinology casualty services of a tertiary health care facility of North India. While driving a mobike he had sustained a sharp injury to his neck, when his neck was all of a sudden struck by a string that was tightly stretched in the middle of the road, at level of his neck. The poor visibility during evening did not allow him to halt in time nor take a detour. The string had cut through his neck and his fingers when he had attempted to untangle himself (Figure 2).



**Figure 1: Neck wound due to kite string injury; bleeding external jugular vein (arrow) (schematic).**



**Figure 4: Injuries to the neck with breach of skin, subcutaneous tissues and platysma.**



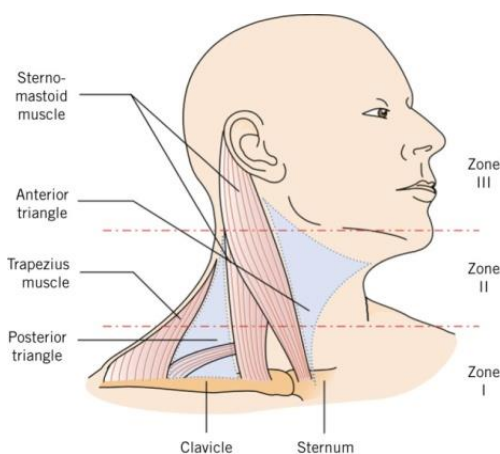
**Figure 2: Distal digital of index finger with a sharp wound due to kite string.**



**Figure 5: Post-operative view.**



**Figure 3: Cervical exploration of neck wound with digital pressure tamponade on bleeding external jugular vein.**



**Figure 6: Schematic; classification of anatomical zones of the neck-Monson 1969;<sup>6</sup> zone 1 extends from clavicles to cricoid; zone II from cricoid to angle of mandible, and zone III from angle of mandible to skull base.**





**Figure 7: Anatomical zones of the neck; zone 1 (below arrow); zone 2 (middle arrow); zone 3 (above arrow).**

He was shifted to the ENT operation theater for cervical exploration under local anesthesia and minimal anesthesia monitoring. Cervical block was given. The wound was thoroughly cleaned, blood clots removed. On examination there was a sharp 6 cm long cut on the left lateral side of neck and there was an open gaping wound with laceration of the platysma and the external jugular vein (Figure 3). The external jugular vein was identified and ligated. Integrity of the other neurovascular structures of this area was assessed. Minor bleeding areas on the sternomastoid muscle were bipolarized and haemostasis achieved. Strap muscles and sternocleidomastoid sutured using Vicryl 3-0 and skin with ethilon (Figure 3). A negative suction drain was retained to drain the blood and healing fluids. Wound was closed in two layers (Figure 4). The cuts on the fingers were sutured. The patient was kept indoor for 4 days so as to check development of any hematoma. The negative suction drain was removed on 4th day when there was no collection. Sutures were removed on the 10th day.

## DISCUSSION

Discontinuity of the cervical enveloping muscle, the platysma consequent to neck trauma is appropriately captioned 'penetrating cervical injury'.<sup>2</sup> Global statistics report high velocity road traffic accidents, homicidal assaults or suicidal events; the latter two involving sharp edged weapons or gunshot wounds, as the common causes of penetrating wounds.<sup>3</sup> Kite string penetration, either by the traditional Indian manja laced by the biodegradable Chinese dor, does not get a mention in western literature.

The kite string trauma is grouped into primary impact and a secondary impact injury. The primary impact injury is due to entanglement of the string cord all around the head, face, neck limbs or the body with often sharp

lacerations at these sites. Moreover, during string disentanglement there may be injuries to the hand and the feet.<sup>4</sup> Secondary impact injury is due to fall on the ground, when there is string entanglement around the body and lower limbs of the individual. The person may sustain fracture of his extremities. Often two-wheeler riders topple off from a moving vehicle with life-threatening head or bodily injuries.<sup>5</sup>

These days people frequently use chemical or Chinese manja, which is based on non-biodegradable synthetic fibers. It is hard to break and has caused a sudden surge in dangerous kite-string-related injuries.

The activities of kite flying and manja itself cause a lot of injuries. After reviewing literature, one can find injuries ranging from simple laceration injuries to hands and fingers to fatal cut throat with associated injuring to the neck vessels, leading to death.

The assessment and management of penetrating trauma to the neck has traditionally centered on the anatomical zone-based classification first described by Monson et al in 1969 (Figure 6).<sup>6,7</sup>

The casualty service handles the neck injuries in accordance to three neck zones with each zone having a different clinical presentation with intervention likewise. These distinct zones, moreover dictate precise initial evaluation and management *vis a vis* the limitations of surgical intervention and vascular control in each zone.<sup>3</sup>

### Zone I

It is the lowermost anatomic zone extending inferiorly from the clavicle to superiorly the horizontal plane at the level of the cricoid cartilage. This region contains major vascular structures like the subclavian artery and vein, jugular vein and common carotid artery as well as the esophagus, trachea and thyroid. Sternotomy or thoracotomy maybe resorted to for adequate surgical access in zone I to achieve haemostasis. Managing vascular injury is challenging in this zone with a high mortality.

### Zone II

It is the middle zone extending between the horizontal plane at the level of the cricoid cartilage and the horizontal plane at the gonion/angle of the mandible. This region contains the common carotid artery, internal and external carotid arteries, jugular vein, larynx, hypo pharynx and cranial nerves X, XI and XII. In this zone the vessels are mobile and easily accessible with a low mortality rate.

### Zone III

This is the uppermost zone extending between the horizontal plane of the angle of the mandible and the base

of the skull. A craniotomy and a mandibulotomy with anterior mandible displacement are needed to access this zone. Due to difficult access to this zone, the mortality rate is quite high.

In these types of trauma patient's, initial assessment is per advanced trauma life support protocol developed by the American College of Surgeons.

The key issues in initial evaluation are enumerated.<sup>8</sup> Airway trauma is to be excluded as there is a high likelihood of missing injuries to the trachea. The supine or Trendelenburg position is to be adopted to avoid air embolism.

Direct pressure tamponade over the bleeding wound to be applied to check blood loss. Unnecessary probing of site of trauma to be avoided in the casualty lest it might lead to dislodgment of clot and further blood loss. Blood sample for cross-matching and intravenous access with two large bore intravenous cannulae are the prerequisites for resuscitation.

Zone I, trauma usually involves the subclavian vessels and thus avoid intravenous cannulation on the ipsilateral side as there will be extravasation of the administered fluid.

Active hemorrhage, shock, hematemesis, or extensive subcutaneous emphysema, following cervical trauma necessitate urgent intervention in the surgical OT.

In the Gupta et al study, retrospective 187 subjects study had majority of male patients (n=114) in the age group of 16-25 yrs. Overall, the head and neck (59%) and upper extremities (28%) were the most frequently involved regions.<sup>9</sup>

Kite-flyers are vulnerable to injuries to their hands and face. Mir et al series documented meticulously 11 subjects who had inflicted injuries to the hand and with their outcome. 7 had injuries in zone II of the hand, while 4 patients presented with zone III hand injuries. One of the patients had a nerve injury, and no patient had any major vessel injury.<sup>8</sup>

Tumram et al reported a young adult, riding a two-wheeler with kite string entanglement around his neck and with laceration. There was associated tracheal injury, leading to massive subcutaneous emphysema, and in spite of surgical wound timely tracheotomy and effective cardiopulmonary resuscitation did not survive.<sup>10</sup> A rare complication due to kite string injury is development of pseudo aneurysm of the injured vessel.<sup>11</sup> Radiograph chest is vital to assess associated injuries, shift or compression of trachea, laryngeal or pharyngo-esophageal injury, vascular injuries or subcutaneous emphysema.<sup>10,12</sup>

In our patient there was injury in zone II of the neck (Figure 7). The kite string had sliced almost through the entire left lateral side of the neck. The skin and the superficial fascia with the platysma were sharply divided with laceration of the external jugular vein, which had bled. A temporary compression by the stagnant blood clots and a bandage by the attendants had controlled the hemorrhage. Cervical exploration of the posterior triangle revealed integrity of the supraclavicular and greater auricular nerves but a discontinuity of the external jugular vein which was repaired to check further blood loss. The extent of damage to human tissues that can be inflicted by an innocuous looking kite string and necessity of regulations to check the promotion and availability of such lethal strings and moreover a suggestion to participate in this sporting activity in open grounds preferably, is emphasized upon.

## CONCLUSION

Kite string penetrating cervical trauma necessitates prompt diagnosis and intervention. Strict restriction on the use of the non-biodegradable kite string should be implemented along with spreading awareness on its likely harm at social media platforms.

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