

## Manja Injury: A Dangerous Mechanism of Cervical Injury

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**Abstract:** Kite flying is a popular sport in many countries around the world including India, Pakistan, Bangladesh, Brazil etc. Most of the injuries sustained during kite flying include falls, cuts, electrocution or head and neck injuries. Kite string can lead to injury to head and neck of bystanders including pedestrians and two-wheeler riders. Injury to neck is important as neck not protected by bony skeleton is vulnerable to penetrating trauma by kite string and can lead to fatal consequences. The severity of injury depends on the abrasive material placed on the string as well as the on the speed of the two wheeler as well as on the speed of kite. Preventive measures including choosing a safe location away from road traffic, electrical cables and airport along with public awareness is indispensable to address this problem. Owing to the unique mode of injury and scanty literature available over this mode of injury, we, hereby, present a case report of 15 year old male who sustained neck injury due to entangled kite string while riding a two wheeler. The patient suffered carotid sheath tear along with laryngeal injury with no vascular injury which was managed with local wound exploration and primary repair of these structures..

**Keywords:** Kite flying, neck injury

### INTRODUCTION

Kite flying is a popular game in many cultures around the world. Kites were introduced in China around 3000 years ago and gradually spread throughout Asia, Europe and America. This game is much popular in countries like India, Pakistan, Bangladesh, Brazil etc.[1].In India, bowed kites or flat kites made of paper attached to cotton or synthetic threads are used. This sport includes flying of the kite and cutting the string of the rival's kite using abrasive thread with sufficient tensile strength [2]. The kite string, often called 'manja' is made of cotton or nylon coated with fine glass powder using glue and other chemicals as adhesives. In Brazil, coating kite line with ground glass and paper glue is a common practice and this coating is called cerol [3]. Kites are associated with various type of injuries [2]. Amongst them, neck injuries caused due to kite string form a substantial proportion and often proves to be fatal [1]. Owing to the unique mode of injury and scanty literature present over this mode of injury, we present a case report of 15 year old male who sustained neck injury due to entangled kite string while riding a two wheeler. The patient suffered carotid sheath tear along with laryngeal injury with no vascular injury which was managed with local wound exploration and primary repair of these structures.

### CASE REPORT

A 15year old male was riding a two-wheeler in a field when a kite thread entangled the neck causing

laceration over the neck and on face. The patient presented to Emergency Department, Jai Prakash Narayan Apex Trauma Centre (JPNATC), New Delhi 3 hrs after the injury.

On arrival to Emergency Department, patient was triaged to Red Area owing to penetrating neck injury and dangerous mechanism of injury. The patient was managed using Advanced Trauma Life Skills (ATLS) protocol. On assessment, the airway was patent and cervical collar was applied to stabilize the spine. In breathing, the Respiratory rate was 18/min, bilateral air entry was equal, chest was clear and Chest Compression Test (CCT) was negative. The patient maintained saturation (SpO<sub>2</sub>) of 99% on room air. In circulation, Pulse Rate was 80/min. Blood Pressure was 130/90mm Hg and Pelvic Compression Test(PCT) was negative. The patient was full GCS score (15/15) with bilateral pupils normally sensitive and reactive to light. Patient was exposed and hypothermia was prevented. On abdominal examination, it was soft, non-tender and Bowel Sound were present. Chest X Ray was normal and FAST was negative. There was a 6cm transverse laceration over the anterior and left side of neck with platysma breach and left sternocleidomastoid tear (Fig. 1).

Patient was haemodynamically stable and CECT neck with esophagogram was done. On imaging (Fig. 2, 3), the trachea was normal with no air leak. The

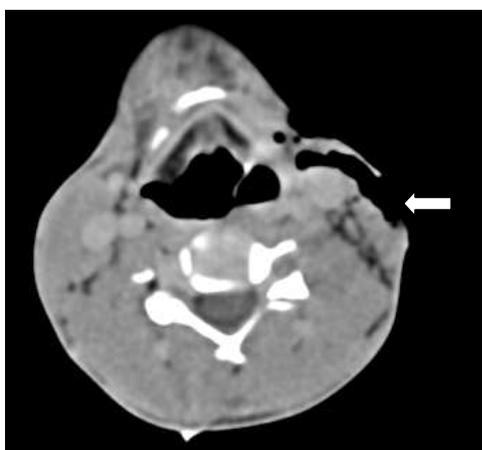
left carotid sheath was completely torn with no vascular injury. The left sternocleidomastoid haematoma with complete transection along with tear of strap muscles was present. The blood investigations revealed Hb-11.2gm/dl, TLC-12,600/mm<sup>3</sup>, Urea/Creatinine-19/0.6gm/dl and Na/K- 140/4.1mEq/l.

The patient was shifted to Operation Theatre and local wound exploration (Fig. 4 a and b) was done. Left Carotid sheath tear and partial tear of thyroid cartilage was identified. However, there was no vascular injury. The strap muscles were torn and haematoma was present in left sternocleidomastoid. The carotid sheath and thyroid cartilage alongwith sternocleidomastoid and strap muscles were primarily repaired. A 14Fr drain was placed. Wound closed in layers (Fig. 5).

On post operative day1, the patient was comfortable and afebrile. Vitals included Pulse Rate-80/min , Respiratory Rate - 18/min and Blood Pressure-120/82mm Hg. The drain output on Post operative day 1 was 20ml serosanguinous in character. The patient was allowed liquid diet orally on post operative day 1. The drain output decreased to minimal on Postoperative day 2 and was removed. Patient was allowed solid diet and was discharged on Post operative day2.



**Fig. 1:** Transverse laceration due to kite string on anterior and left side of neck.



**Fig. 2:** Transverse section of CT scan of neck showing carotid sheath tear on the left side of neck



**Fig. 3:** Coronal section of CT scan of neck showing carotid sheath tear on the left side of neck



**Fig. 4a:** Partial Tear of Thyroid Cartilage



**Fig. 4b:** Left Carotid Sheath Tear



**Fig. 5: Primary skin closure of the laceration with drain placed**

## DISCUSSION

Kite flying is a popular sport in countries like India, Pakistan, Bangladesh, Brazil etc. [1]. Kite flying is associated with myriad of injuries. As per an estimate from Pakistan in 2006, 450 people have been killed over past 10 years during kite flying festival with most of them being teenagers and children [2]. Kite flying injuries include accidents that occur during preparation of strings (manja), electrical injuries from high tension current, injuries of hands due to string, falls occurring during catching the kite or injuries caused due to kite string to bystanders including pedestrians or two-wheeler riders [2, 4, 5]. Hand, with palmar and lateral aspect of distal and middle digits of index finger and palmar aspect of thumb predominantly affected is the most commonly involved organ in kite flying injuries [3]. Injury sustained by two wheeler rider or pedestrian predominantly involve neck followed by angle of mouth with extension to cheek [3]. Contact between manja and human skin can cause laceration of the skin and deep fascia of neck injuring internal cervical structures like carotid arteries, jugular veins, larynx and trachea [6]. Wearing helmets prevent injuries to face so neck injuries are more common. Usually the injuries over neck and forehead are transversely or obliquely placed while injuries over philtrum and bridge of nose are transversely placed [3]. Moreover, injury by two wheeler rider are more severe than pedestrian as severity depends on both the speed of two-wheeler and the flying kite which is directly proportional to wind speed. Not only this, the killer thread-manja may prove to be more dangerous if it is white in color as it is not easily visualized by the motorist. In our case report too, the rider was teenager not wearing helmet and sustained transversely placed injuries on neck and face.

In a cross-sectional retrospective study by Mehmood *et al.* in 2010 [1], 139 patients who sustained kite flying injury were studied. 91% of the patients were males and 63% of them belonged to the age group of 10-39 years. 55% patients suffered injuries directly due

to kite string with 28.78% patients having simple cuts on finger while 11% had neck injuries.

In another case series of 13 patients suffering from cervical injuries due to kite string in Brazil by Ventura *et al.* [6], 12 patients had Zone II injury while only one patient had Zone III injury. Moreover, platysma breach was present in all patients but only one patient had threatened airway and hence, was intubated due to associated neurological deficit. The study revealed the most common non-fatal injuries as jugular vein injury (6 out of 13 patients), Laryngeal Injuries (6 out of 13 patients) and tracheal injury (1 out of 13 patients). Carotid injury occurred in only one patient who eventually died. All wounds were explored and venous injuries were managed using ligatures while respiratory tract injuries were primarily repaired. Tracheostomy was done in three patients.

In our case report too, the patient suffered Zone II injury with platysma breach. The carotid sheath tear with thyroid cartilage tear of larynx was primarily repaired. There was high suspicion of carotid artery injury due to sheath breach however the patient did not suffer any vascular injury. Tracheostomy was not done in management of our patient.

Kite flying is now considered a high risk activity [6]. The magnitude of kite flying injury is evident from the fact that Supreme Court of Pakistan banned kite flying in year 2005 which was later lifted on popular demand [3]. There are multiple case reports of kite flying injury from all over the world. Neto *et al.* [7] reported two patients who suffered from neck injuries due to kite string. One patient had internal jugular vein laceration while other had tracheal injury. In a news article published in India, a person in Mumbai sustained rupture of voice box while another person in Chennai died due to kite string injury [8, 9]. Singh V *et al.* [10] also published a case report of 41/2 year old boy who sustained kite string injury over face involving lower labial mucosa and angle of mouth extending upto neck. There was no facial paresis and the wound was debrided and primarily closed layerwise. Singla *et al.* [11] also reported a case of motorist who sustained cervical and shoulder injury due to kite string. Our case report add to these similar type of studies, however, is unique in that none of them presented the potentially fatal injury to carotid sheath and hence the artery due to kite string. In another case report by Tumram *et al.*, cervical injury sustained by manja was primarily repaired with tracheostomy but the patient developed extensive mediastinal and subcutaneous emphysema due to laryngeal injury in post operative period which eventually proved fatal [12]. However, in our patient, the post operative period was uneventful with no subcutaneous emphysema.

Kite string injuries also include electrical injuries and burns. In a case report by Wankhede *et al.* [2], a 25 year old died while trying to catch a cut down kite having thin copper wire as its string. The copper wire touched an uninsulated power line transmitting alternate current of 240V at 50Hz to the victim. In another study of six paediatric patients suffering from kite flying injury, Tiwari *et al.* [13] showed kite flying as a mode of electrical injury in children.

Thus, Kite flying, though an important sporting event among various cultures, is also an important mode of injury and medico-legal aspects pertaining to such injury must be understood. Injury caused by manja are always accidental. However, these injuries can disfigure face permanently by chopping of the ear or nose or the by the scar formed after healing of the incised wound. Incised wounds of neck can damage vital structures running in the neck and can prove fatal. Manja could be considered a dangerous weapon under Indian Penal Code Sections 324 and 326 according to which- 'A dangerous weapon is any instrument for shooting, stabbing, cutting or any instrument which, used as a weapon of offence, is likely to cause death.' It can also cause grievous hurt (Indian Penal Code Section 320) by endangering the life of a person, or by cutting – off any member of the body, or by hampering function of any member of the body' [3]. The role of Manja as dangerous weapon or instrument of grievous hurt should be clear to every emergency physician dealing with trauma before making any medicolegal documents.

Kite flying injuries are preventable. For the kite flyers, wearing gloves in hands and full sleeve shirts, trousers and shoes will prevent injuries [3]. Choosing a safe location such as an open beach or field with a diameter of atleast 100metres) and maintaining safe distance from telephone lines, electricity cables and road traffic is essential [6]. Such locations should also be not near an airport, electric service line or bird sanctuary. Manja kite-lines are known to cause damage to airplanes, fatalities by electrocution and injuries to birds [3]. Moreover, participants should not touch the kite string during flight and not allow anyone to walk in between the control handle and the kite [6]. A preventive program should be developed to decrease the number of kite flying related injuries. Legislations must be framed and implemented but the foundation to prevent kite flying injuries lie in public awareness and educational reinforcement.

## CONCLUSION

Kite Flying is a popular sport in children and young adults in many countries around the world. However, the rising burden of kite flying injuries and severity associated with them is bothersome. Proper preventive measures supplemented with legislation and

public education is the need of hour to tackle this problem and maintain the sporting spirit of the game.

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