

Kitestring Injury: A Thin Line between Joy and Nightmare!Ganvit S B¹, Mehta T D²¹Department of ENT, GMERS Navsari, Gujarat, India²Department of ENT, GMERS Navsari, Gujarat, India

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Abstract:

Introduction: Colourful kites filling the sky on "Uttarayan" is a mesmerizing sight. It is that time of the year when celebrations ring in the air and happiness touches every heart. However, despite all the happiness, there can be accidental injuries due to glass powder-coated string ("MANJA") that can wreck a fun-filled day. Injuries could range from superficial lacerations to profound muscle, artery, or nerve injuries, which can further lead to minor oozing to life-threatening complications.

Materials and Methods: Fifty medical records were reviewed retrospectively for patients with injuries due to kite string who presented to the Emergency Department at GMERS Medical College and Hospital, Navsari, from January 2021 to January 2024. Patients with direct kite string injury to the neck were included; other cases were excluded. All patients had varying degrees of injuries and were managed in GMERS, Navsari.

Results: In total, 50 patients (Forty-two men and Eight women) were evaluated in the present study. Out of 50 patients, 3(6%) cases of cutaneous vascular injuries, 11(22%) cases of cutaneous and Platysma laceration, 8 (16%) cases of strap muscle injury, 12 (24%) cases of Sternocleidomastoid muscle injury, 13 (26%) cases of vessels injury, 3 (6%) cases of laryngotracheal injury were observed. There was One(2%) mortality.

Conclusion: Kite flying can be a high-risk activity due to penetrating and life-threatening injuries to vital organs. However, injuries related to kite flying can be prevented by taking proper precautions.

Keywords: kite string, MANJA, laryngotracheal injury.

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Introduction

"Kai Po Che..... Lappet.... The happiness of flying kites and the enthusiasm for cutting an opponent's kites sometimes turn into lifetime punishment for others without any offense. 14th January is celebrated as "UTTARAYAN" or "MAKAR SANKRANTI." One Festival – Many Names– the day when the glorious sun god begins its ascendancy and entry into the Northern Hemisphere causes changes in the wind pattern and the eventual seasonal changes. Celebrated in the western part of India, especially Gujarat, Maharashtra, and Rajasthan, by flying kites. Kites were invented 2000 years ago and were used as signals to deliver messages and measure distances.[4]

Everybody knows the kite: "A frame covered with cloth or plastic and joined to a long thread that is flown in the air" [2]. Initially, kite flying was just a hobby. However, as time passed, this Festival became Fighting Festival, where the children and adults attempt to cut opponents flying kites by pulling strings to prove their supremacy in the sky[1]. During such instances, both ends of the cut kite string may get entangled and become taut,

which could behave like a sharp weapon[1]. Sadly, people use dangerous kite strings called "MANJA"- a type of kite thread made from cotton or nylon coated with finely powdered glass using chemical adhesives to make the thread sharper.[5] Additionally, injury due to kite string is not only up to kite flyers but also a potential risk to pedestrians, two-wheeler drivers, and our natural flyers –Birds. These injuries can be superficial to life-threatening.

In this case study, we have treated 50 cases of cut-throat injuries caused by kite strings. This article aims to raise awareness in society to prevent such injuries.

Mode of Injury

Every sport is involved with some injury. Kite flying is a sport where injury can happen to kite flyers and kite runners- who try to catch the "KATI-PATANG", Two-wheeler riders, and pedestrians. The severity of the injury depends on the abrasive material used in the string, the speed of the two-wheeler, and the speed of the kite. Most patients are in some fast-moving open vehicle, usually two-wheelers, without protections like

helmets or neck scarves; hence, when they come in contact with this "Killer Manja," it lead to injuries which can be extensive vascular, laryngeal injuries that can be life-threatening. The amount of kinetic energy the wounding agent delivers has to be considered together with its interaction with the involved tissue[15]. Hence, the wounding capacity of the string is proportional to the person's speed on a two-wheeler [15]. Also, in addition to the sharpness, these strings are extremely thin and light in color, which reduces the visibility in broad daylight. When the slow-moving person comes in contact with the string, they will gate superficial cuts or abrasions.

Relevant Neck Anatomy

Injury to the neck is crucial as the neck has all major vessels and is not protected by a bony skeleton. Understanding the anatomy of the neck, especially the location of vital structures, is essential to providing optimal care. The common areas of the body injured by kite string are the head and neck (59%) and upper limbs (28%)[3]. The penetrating neck injury has been classified as per Roon and Christensen's classification[1,7] [figure 1]. It is divided into three zones.

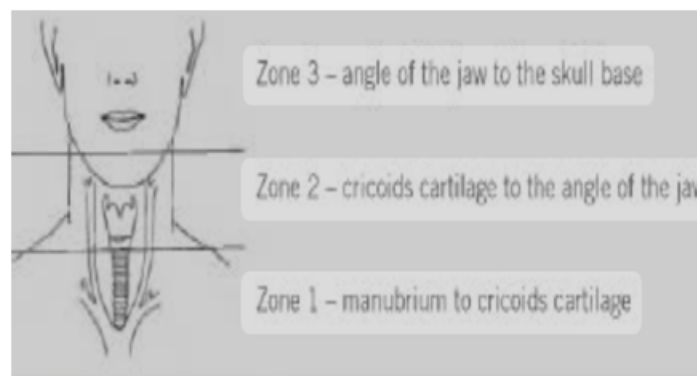


Figure 1:

Material and Methodology

Fifty medical records were reviewed retrospectively for patients with injuries due to kite string who presented to the GMERS Medical College and Hospital, from January 2021 to January 2024. It was the peak period for the celebration of the "UTTARAYAN." Patients presented to casualty with direct contact with kite string to the neck were included in our study. Indirect injuries like falls from the roof and running vehicles were excluded. The primary health care system provided initial treatment in few cases.

The prophylactic tetanus immunization is given and MLC was done in all cases. All patients were managed with appropriate hemostatic, fluid resuscitation, and airway establishment according to advanced trauma life support (ATLS®) protocols[1,6,7]. All routine investigations were

Zone 1: is the area between the clavicle and the cricoid cartilage. This zone contains circulatory structures such as innominate vessels, the origin of the common carotid artery, the subclavian vessels, the vertebral artery, the brachial plexus, the trachea, the esophagus, the apex of the lung, the thoracic duct. Surgical exposure is problematic because of the presence of the clavicle and bony structure of the thoracic inlet.

Zone 2: is the area between the cricoid cartilage and the angle of the mandible. Structures located here are the cricoid and vertebral arteries, the internal jugular veins, the trachea, and the esophagus. This zone is comparatively easy to access for clinical examination and surgical exploration. It is the largest zone and most commonly injured in the neck.

Zone 3: The area between the mandible's angle and the skull's base. It contains the distal carotid and vertebral arteries and the pharynx. Since it is very close to the base of the skull, it is less amenable to physical examination and challenging to explore during surgical evaluation.

done, including X-ray Neck (AP and Lateral). Surgical and Orthopaedic opinions were taken in the indicated cases. After thorough clinical And ENT examination (primary and secondary survey), the patients were classified as having superficial (laceration limited to the skin and subcutaneous tissue) or Deep injury (breach of the platysma and damage to muscles, thyroid gland, neurovascular or airway involvement). Superficial injuries (Figure 2,3,4) were treated in casualty under local anesthesia (2% Lignocaine and Adrenaline) under strict aseptic precautions. Suturing was done with Ethilone 3-0 or Vicryl 3-0, after achieving haemostasis and closure was done in a bilayer or single layer. Lastly, the dressing was applied. Patients having deep injuries were admitted and managed in the operation theatre, rest of the patients were treated on OPD basis. Suture removal was done on the seventh day. In the OT,

exploration and surgical repair were done under general anaesthesia. Patients were kept in ICU for 24-48 hours. Broad-spectrum antibiotics were given. CT scan was done for patients with suspected airway or neurovascular injury after they were hemodynamically stabilized. The neck, oral cavity, and pharynx were carefully examined, and any internal wounds or bleeding were noted. Respiratory distress, aphonia, subcutaneous emphysema, and associated injuries were also evaluated and managed accordingly.[9]. Laryngoscopy were performed to evaluate and manage laryngotracheal injuries, whereas

Esophagoscopy was conducted in suspected cases of oesophageal perforation. Laryngotracheal injuries were treated with tracheostomy[8]. The demographics of the patient (time, gender, and age), site of injury, mechanism of injury, the time interval between injury and transit to the hospital, vital signs at the time of admission, the time interval between the injury and operative procedure, injuries to deep structures, type of operative intervention required, postoperative complications, duration of hospital admission, and mortality and morbidity were recorded. All data were collected and analysed.



Figure 2: Simple lacerations



Figure 3: Injury to neck with breach of platysma and muscle

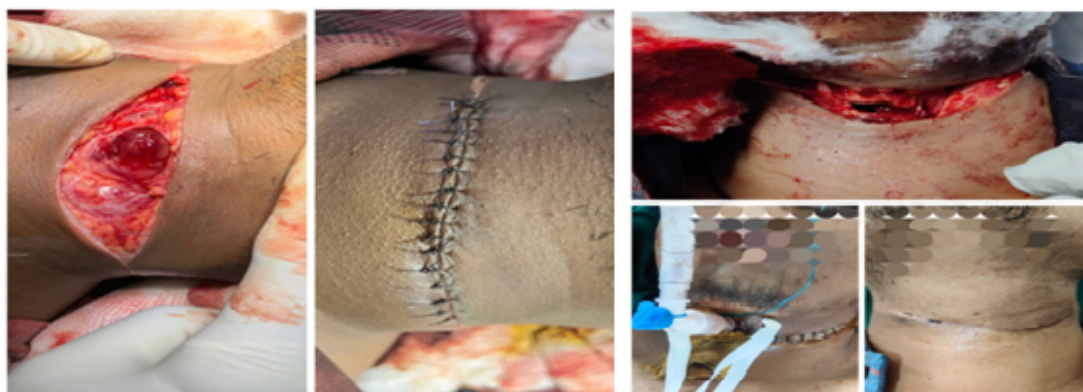


Figure 4, 5: Pre-operative and postoperative view of laryngotracheal injury due to kite string

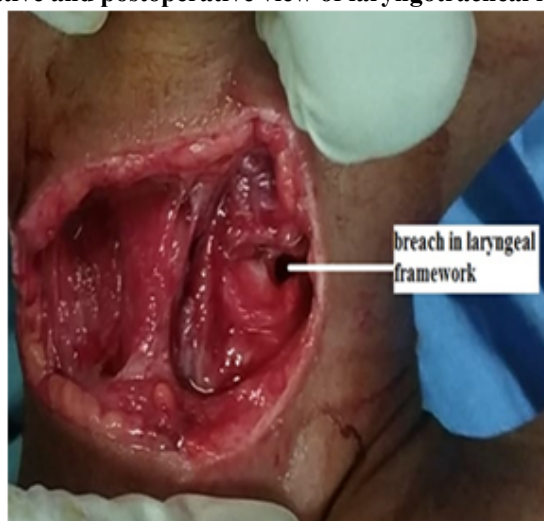


Figure 6: The victim on the motorcycle suffered cervical penetrating trauma

Results and Discussion

A total of 50 patients were presented with penetrating neck injuries due to direct contact with kite string from January 2021 to January 2024. Among these, 42 were male, while only eight were female (5:1). A study conducted by Chakraborty D et al. [1] in 2016 also noticed a higher incidence in males. Similar findings were noted by Ventura[11] et al., in which the male: female ratio was 12:1. This might be due to males being more engaged in outdoor activities than females.

The Maximum number of patients reported on the 14th and 15th of January was 35(70%). A Study by Vaishnav DA[10] et al. also noted the maximum number of patients on these two days. 7(14%) patients were presented before the week of the Festival, whereas 6(12%) were reported later. 2(4%) patients were coming in the month of November-December.

Suggests the craze of kite flying among youngsters starts early before the Festival and lasts about one week after.

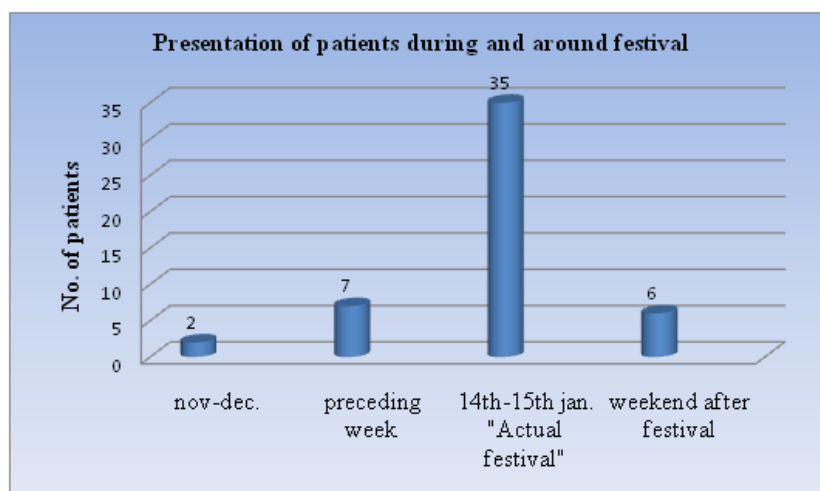


Figure 7:

In our study, 30 people in the 19-40 age group were most commonly affected (60%). The youngest was 20 months old, while the oldest was 62 years old. A study conducted by Gupta et al. [3] noticed that most of the patients were in the 16- 25 age group.

Table 1:

Age(Years)	<18	19-40	41-60	>60
No. of patients	7(14%)	30(60%)	12(24%)	1(2%)

Zone 2 is most commonly affected, followed by zones 1 and 3. A study by Kakadia Y[12] et al. observed similar findings.

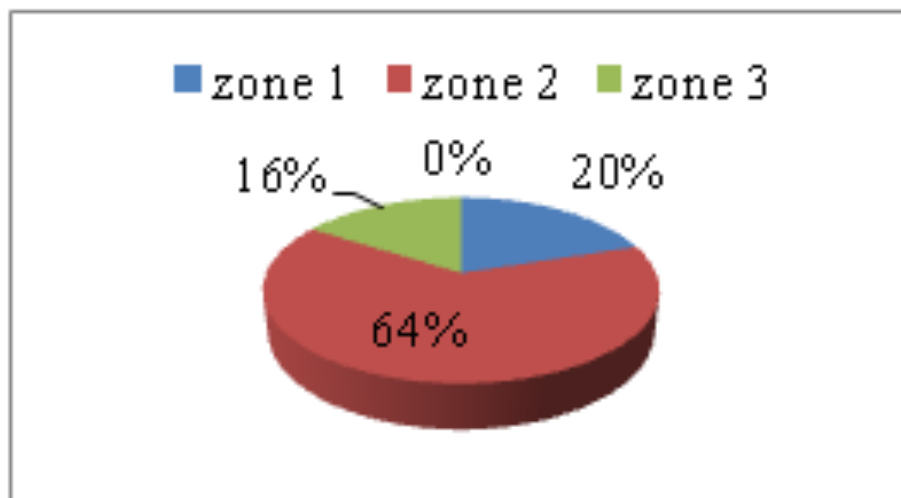


Figure 8:

The time interval between the accident and hospital arrival varied between 15 min to 5 hours. (Average time was approx. 30 min). Peripheral health centers packed patients with pressure bandages around the wound. All patients were brought conscious. Approximately 10% of cases were hypotensive and were resuscitated by controlling bleeding and fluid administration. Only three patients were presented with laryngeal trauma with disruption of the cartilaginous framework and loss of voice. Superficial cuts were sutured, but deep penetrating neck injuries were immediately explored in the OT. The time duration for controlling and stabilizing

the patient depended upon the penetration of string and vital injuries. Superficial injuries required minor vessel ligation and suturing. However, deep injury requires hours for proper exploration, followed by homeostasis and closure. Tracheostomy and vascular ligation were performed in three cases of laryngeal injury. The average duration of hospital stay is 3- 5 days. The patients with airway injuries were admitted for at least one month and discharged after the removal of the tracheostomy tube. A check of 70*scopy was performed to examine the status of the recurrent laryngeal nerve. Most of our patients were in the

young-adult age group, but it was shocking to know how our youngest (20 month old) patient (2%) got injured: a mother and her child went to the terrace to enjoy the Festival. Unfortunately, it turned out to be dreadful as the string of cut kites passed from the neck of the child and led to laryngotracheal injury. Despite all efforts, the child could not survive due to postoperative emphysema. 2(4%) children got injured while spectating kites, while 1(2%) got injured due to sitting in front of a two-wheeler. The rest of the patients were injured while riding the two-wheeler, often motorcycle and bicycle. Out of 50 patients, only 2(4%) were wearing helmets. However, the helmet only protects the face from injury, but the neck remains exposed. One patient (2%) was wearing scarves over the neck, but despite of it, the patient got injured, which indicated how deadly kite thread was. Not a single patient had to guard wireframes in front of their vehicles which means the Guard wireframe protects neck from thread injuries. Injury due to kite string varied from simple to

complicated. skin laceration was found in 3(6%), skin subcutaneous tissue and platysma injury in 11(22%), involving the strap 8(16%) and sternocleidomastoid in 12(24%). This was similar to the study conducted by Vaishnav DA[10] et al. Injury to vessels was found in 13(26%) cases. Among them, 2(4%) had anterior jugular vein injury, 6(12%) had anterior and external jugular vein injury, and 5(10%) had external and internal jugular vein injury. Fortunately, the common carotid, the internal and external carotid arteries were not damaged in any of the case.[3] (6%) patients had airway injuries that required tracheostomy[4,8] followed by repair of the framework. The pharynx and esophagus were intact in all the cases. None of the patients had serious head injuries. All patients in the present study required surgical intervention for obvious clinical indications. Postoperative complications, including subcutaneous emphysema and aspiration of blood, were observed in one patient, and the mortality rate was 2% (one patient.)[9]

Table 2:

Depth of the injury	No. of patients
Skin	3
Skin, subcutaneous tissue, and platysma	11
Strap muscle	8
Sternocleidomastoid muscle	12
Vessels	13
Airway	3

Preventive Measures

We can avoid this kind of life-threatening situation by following safety rules. Appropriate preventive measures include a safe place for kite flying, like open beaches or playgrounds. The local government authorities should organize formal kite competitions to discourage unwarranted kite flying from roof-tops and kite flying near power lines should be prohibited. Always take precaution near electricity cables, telephone lines, trees, people, and animals. Government officials should also prohibit kite flying near railways and major roadways to

avert such deadly casualties.[13] There is a complete ban on kite flying during the spring season in Pakistan.[14]

Kite merchants should be prohibited from selling glass powder coated threads. Awareness programs should be run over television and radio. Avoid travelling on two-wheelers, but when travelling is compulsory, use a helmet, gloves, neck scarves, and installing metallic wire guard (as shown in picture), on two-wheelers should be encouraged. Medical facilities for immediate care and transport should be available during such events.[3]

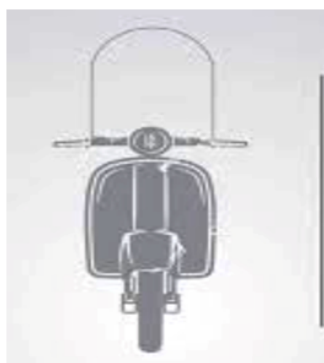


Figure 9: A meter-tall metallic rod inverted 'U' shaped near the visor of bike during Uttarayan to protect against neck injuries

Conclusion

Through this study, we highlight how a simple thread can turn into a death trap if people do not remember the 3 C's – Common sense, Courtesy, and Caution. This study concludes that "Prevention is always better than cure." By taking appropriate preventable measures, we can avoid such life-threatening events. It is difficult to prohibit kite flying because it is a festival, but an off-season ban should be encouraged. Awareness programs regarding possible hazards of kite flying and social counseling should be encouraged. Strict legalization should be there on making "MANJA" without glass powder because usage of glass powder is dangerous.

Additionally, it should be made mandatory to use guard wireframes in front of two wheelers. Emergency medical facilities should be strengthened to provide immediate treatment because life costs more than anything else. It is better to enjoy the festival healthily and safely.

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Ethical approval: Not required

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