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Surgical correction of a cervical tourniquet injury by a forgotten rubber band in a dog: A case report

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Abstract

Cervical tourniquet injury or rubber band syndrome is an uncommon finding in humans and animals. It is usually found in communities which use rubber bands for their daily aesthetic or utility purposes. The cardinal signs of a forgotten rubber band in the cervical region usually include a circumferential cicatricial scar with a chronic discharging sinus at the ventral aspect of the neck. This is the first report in veterinary medical literature of a dog suffering from a non-healing, infected, gaping, circumferential, tourniquet injury of the cervical region. Timely diagnosis and surgical management prevented complications such as sawing of the tracheal lumen and associated cervical structures, and resulted in uncomplicated recovery of the dog.

Keywords: Cervical tourniquet injury, rubber band syndrome, circumferential, gaping wound

Introduction

Cervical tourniquet injury or rubber band syndrome is an uncommon finding in human and veterinary medicine^[3, 4]. In humans, it is a rare finding in younger children^[1] and elderly people with cognitive impairments^[2] living in communities where elastic bands are worn on the wrists or extremities for decorative purposes. It is rarely seen in animals, and found especially in synanthropic animals secondary to getting trapped in nets, traps, wires, ropes, elastic bands^[5] or due to human malicious intent^[11].

An elastic band may have variable constrictive effects on living tissues owing to its tensile and mechanical properties^[6]. Contrary to other materials, rubber bands respond to minor increase in temperatures by increase in their tensile strength, therefore, resulting in an increase in their constrictive effect^[7]. In literature, two key presentations have been observed – acute and chronic. The acute presentation is secondary to a relatively less elastic band which results in compartment syndrome and is discovered early. It is also known as compression band syndrome^[6, 8]. The chronic presentation is seen due to a more elastic band left in the site for a longer time and it gradually burrows into the deeper tissues causing oedema, infection, loss of function and sometimes neurovascular damage. It is also known as forgotten rubber band syndrome, ‘dhaaga’ syndrome or elastic band syndrome^[1, 9, 10].

There are few reports in veterinary literature regarding cervical forgotten rubber band syndrome. The present report is on successful surgical correction of a circumferential, gaping, infected, exudative, non-healing, cervical wound in a dog due to a forgotten rubber band placed around the neck.

Material and Methods

A 2 year old, female, intact, indigenous dog weighing 11.5 kg, was presented to the Department of Veterinary Clinical Complex, College of Veterinary Science, Sri Venkateswara Veterinary University, Tirupati, for the evaluation of a deep, circumferential, non-healing wound at the cervical region.

The owner reported that she did not know the cause or duration of the wound. Prior to presentation, the dog was treated with Tab. Amoxicillin clavulanate 500 mg b.i.d. and Tab. Meloxicam 5mg o.d. for 4 days, without any improvement. The patient was not active and had reduced feed and water intake.

On physical examination a full thickness, one and half inch deep, circumferential gaping wound with oedematous wound margins was noticed (Fig. 1). There was a thin layer of exudative granulation tissue over the lacerated ends and the surrounding epidermis and hair were crusted. The skin, subcutis and cervical muscles were completely lacerated circumferentially. Dorsally, the wound margins extended from rostral to the base of tragus of

right ear exposing the cartilage of the horizontal ear canal to the caudal region of the base of the left ear. Laterally, caudal to the vertical ramus of the mandible and ventrally till the cricoid cartilage of the larynx. On gentle retraction of the wound edges, a pink coloured rubber band was visible deep along the circumference of the wound (Fig. 2). On further enquiry, the owner reported that children used to play with the dog and might have placed the rubber band around its neck.

On auscultation, no signs of dyspnoea were observed. The dog was presented on empty stomach since the previous evening and emergency surgical intervention was decided on the same day.

After aseptic preparation of the surgical site, the dog was pre-anaesthetised with atropine sulphate (@0.04 mg/kg, SC). The patient was anaesthetised with midazolam (@0.1mg/kg, IV) and thiopentone sodium (@10mg/kg, IV) and then maintained with 2% isoflurane in oxygen using a cuffed endotracheal tube. Perioperative antimicrobial prophylaxis was provided with ceftriaxone (@ 20mg/kg, IV). The surgical site was prepared in routine aseptic manner and gentle debridement of the wound edges was done with povidone iodine (5%) and sterile normal saline soaked gauze. The patient was laid in left lateral recumbency and the wound was explored. The elastic band was located, two haemostatic forceps were used to clamp the band 1 inch apart, and was incised in between and removed. The stretched pink band was a commercially available rubber band measuring 12.71cm in length and 0.37cm in width unstretched (Fig. 3).

After removal of the rubber band, the lacerated cervical muscles were apposed with No.1 braided Polyglycolic acid in interrupted vertical matrix suture pattern. The subcutaneous tissue was sutured with 2-0 braided Polyglycolic acid in continuous subcuticular suture pattern, followed by closure of skin with 1-0 monofilament Nylon in simple interrupted suture pattern (Fig. 4). The base of the right ear was reconstructed along with the subcuticular tissue and skin. A thin layer of cotton soaked with tincture compound benzoin was applied over the suture line for additional haemostasis. Cervical and over the head padded bandage was applied for protection of the surgical site.

Postoperatively, pain management was done by administering meloxicam (@ 0.2mg/kg, SC), to be continued for the next 2 days and antimicrobial prophylaxis by administering ceftriaxone (@ 20mg/kg, IV), to be continued twice in a day for the next 5 days. Daily wound dressing and oral Deep TBR₁ tablet once in a day was prescribed for the next 5 days. Feeding from an elevated platform to prevent suture dehiscence due to ventral flexion of the neck was advised for the next 15 days.

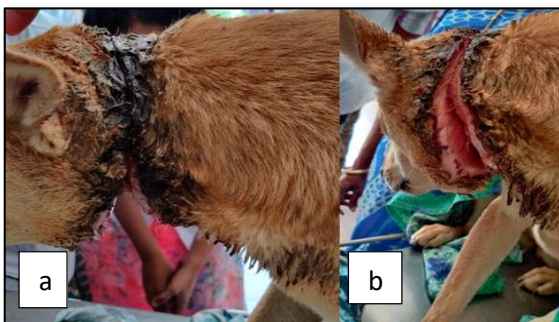


Fig 1: a and b. Pre-operative photographs of a 2 years old, indigenous dog presented with a deep, circumferential, exudative, non-healing, gaping wound with oedematous wound margins and crusted surroundings.



Fig 2: Pre-operative photograph with a constricting rubber band after retraction of the wound edges around the neck.



Fig 3: Photograph showing the retrieved rubber band.



Fig 4: Immediate post-operative photograph showing the sutured wound.

Results and discussion

Twenty-four hours post operatively, the sutured edges revealed no dehiscence, discoloration, or oedema with slight exudation. Pain was not evinced on palpation. Complete wound healing was seen by 10th postoperative day. The cutaneous non absorbable sutures were removed on the 15th post operative day. On 27th post operative day, evidence of new hair growth was seen on the ventral aspect of neck (Fig. 5). Owner reported that the animal was active and had normal feed and water intake, resulting in uneventful recovery.

The cardinal presented signs of a forgotten elastic rubber band in the cervical region usually include a circumferential cicatricial scar with a chronic discharging sinus at the ventral aspect of the neck [14]. Also, there is some degree of asphyxia and/or dysphagia [20, 21], oedema of the head and ischemic necrosis of the underlying tissues due to the strangulation effect of the elastic band which depends on the duration of application, tensile strength of the elastic band, thickness, depth, location, position, and organ association of the area to

which the band has been applied [19].

Commercially available rubber bands are an excellent example of easily available, low costing elastomers which exhibit the Gough Jule effect [7]. This indicates that contrary to most solids or liquids which respond weakly to small changes in surrounding temperature, the stretched rubber band's tension noticeable increases to a small increase in surrounding temperature, which in this case is the body temperature of the dog.

When left in place for a long time, forgotten rubber bands as opposed to acute tourniquet injury, gradually dig into the skin and deeper structures of the tissues to which they have been applied, simultaneously the adjacent skin tries to heal itself by re-epithelialization [18] and thus, a circumferential cicatricial scar forms which is chronically exudative, discharging via a sinus due to foreign body reaction to the rubber band in the deeper tissues. In case of cervical involvement asphyxia and dysphagia is due to the indirect or direct constrictive effects of the rubber band on the trachea and oesophagus. Facial oedema occurs due to obstruction of the lymphatic drainage from the facial region via the thoracic duct. Ischemic necrosis of the underlying soft tissues and neurovascular damage is due to the strangulation of the vasculature of the cervical region under the rubber band. The use of diagnostic imaging like conventional radiography, computed tomography and ultrasound for diagnosing embedded foreign bodies has been described in veterinary and human medicine [14-17].

In the present case the lesion was a non-healing circumferential gaping wound with exudative granulation tissue at the gaping edges which raised the suspicion of the presence of a circumferential foreign body in the wound. Dysphagia was evident at the time of presentation. Careful parting of the wound edges helped visualize the stretched circumferential rubber band. Hence, immediate surgical intervention without the use of further imaging modalities was opted. Forgotten elastic bands resulting in painless artifact ulcers have been described in human medicine [12].

After removal of the constricting elastic band, careful wound epluchage was done prior to apposing and suturing the soft tissues and skin. This prevented the formation of an acquired constriction ring post operatively which often occurs when improper debridement is done prior to suturing a circumferential wound [13]. There was uneventful recovery of the dog with complete epithelialization of the circumferential cervical wound, without any discharging sinus and with growth of new hair in patches as seen on the 27th post operative day.

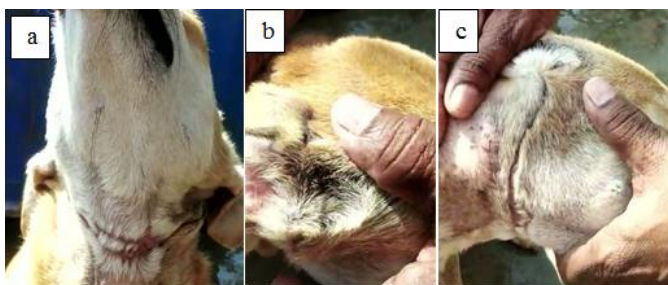


Fig 5: a, b and c. 27th day post-operative photographs showing complete healing of the wound at ventral, base of the ear and lateral cervical region respectively.

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