Cut Throat Injury: Our Experience in Rural Set-Up

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Abstract Cut throat injuries are one of the emergency conditions managed by ENT specialists. If not treated in time, they may lead to death. Prevention of these complications depends on immediate resuscitation by securing the airway by tracheostomy or intubation, prompt control of hemorrhage and blood replacement. The present study was conducted to study the sociodemographic profile of patients of cut throat injury, motives behind cut throat injury, site and depth of the injury, treatment given at our hospital and outcome. A prospective study was done in the department of ENT in a tertiary care hospital of rural West Bengal between January 2014 and December 2015. Patients who were brought dead and minor neck injury were excluded from the study. Endotracheal intubation where possible, or emergency tracheostomy was done below the level of injury. Ryle's tube was inserted where necessary. Injured structures were repaired in layers. Among 22 patients there were 18 male and 4 female. The peak age of incidence was in the 4th decade of life. Suicidal cut throat injury was the most common mode of injury. Most of the injuries were in the zone II (72.73%). Three patients died due to severe haemorrhage and/or aspiration. Decannulation was possible in 9 out of 12 patients. Cut throat injuries have become a major cause of morbidity and mortality in our society. Patients with injury of larynx or upper trachea need preliminary tracheostomy. Post-operative endoscopy identifies nerve injuries and stenosis problems.

Keywords Cut throat injury · Suicidal · Zone II · Tracheostomy · Laryngo-tracheal stenosis

Introduction

Cut throat injuries are one of the emergency conditions managed by ENT specialists [1]. In developing countries the incidence is increasing at a fast rate because of increasing conflict over limited resources, poor socio-economic condition, unemployment, easy access to alcohol and increased crime rates [2]. The aetiology of cut throat injuries can be broadly divided into suicidal, homicidal and accidental [3, 4]. In suicidal attempts family problems, psychiatric illnesses and poverty are triggering factors [4, 5]. The triggering factors for homicidal cut throat injuries are familial and property related disputes, political conflicts and sex related crimes [4, 5]. Accidental causes are mostly related to the road traffic accident and fall injuries [6]. Cut throat injuries pose a challenge to the surgeon in their management. If not treated in time, they may lead to death of the patient due to asphyxia and hemorrhage [7]. Prevention of these complications depends on immediate resuscitation by securing the airway by tracheostomy or intubation, prompt control of hemorrhage and blood replacement [4]. Tracheostomy should be performed immediately when airway obstruction or chances of aspiration of blood exists [8, 9]. The management of these injuries requires a multidisciplinary approach requiring close collaboration of otolaryngologist, anaesthesiologist and psychiatrist. Anesthesiologist secures an uncompromised airway and makes sure the patient is breathing. Otolaryngologist assesses the injury and repairs the severed tissues with the aim of restoration of swallowing,

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phonation and breathing. Psychiatrist provides adequate support and care after surgical treatment [4, 5, 10, 11]. A sudden increase in the number of admissions of patients with cut throat injuries in our hospital prompted us to undertake this study.

Aims and Objectives

The present study was conducted to study

1. The socio-demographic profile of patients of cut throat injury admitted in our hospital.
2. Motives behind cut throat injury of patients admitted in our hospital.
3. Site and depth of the cut throat injury of patients admitted in our hospital.
4. Treatment of cut throat injury patients given at our hospital and outcome.

Materials and Methods

This was a prospective study of cut throat injury patients in the department of ENT in a tertiary care hospital of West Bengal between January 2014 and December 2015. Patients who were brought dead were excluded from the study. Minor neck injury not requiring admission and patient with minor trauma in the neck but major trauma in other parts of the body needing hospitalization were excluded from the study. Total 22 cases of cut throat injury were included in the study who were admitted in ENT ward or referred from general surgery ward. Informed consent was obtained from the guardians or relatives of the patients for this study. This study was approved by the institutional ethical committee. The details of patients including age, sex, mode of injury, anatomical sites zones of injury, presentation at the time of admission, structures injured, delay in hospital arrival, treatment provided and complications, were recorded. The investigations done to detect injuries included X-ray soft tissue neck lateral and AP view, X-ray chest PA view and CT scan neck. Hematological investigations were done to record Hemoglobin, PCV, MCV and MCHC. All patients were immediately shifted to Operation Theater and managed on the basis of ATLS (Advanced Trauma Life Support) guidelines of A B C D E (Airway, Breathing, Circulation, Disability and Exposure). A thorough clinical examination was done including cardiovascular and respiratory system. Hypovolemic shock was corrected by giving volume expanders and blood transfusion. Oxygen was given through a catheter introduced through the wound into the airway temporarily. Suction clearance of the secretions and blood

Fig. 1 Homicidal cut throat injury dividing thyroid cartilage and exposing posterior pharyngeal wall seen behind Ryle's tube

Fig. 2 Suicidal cut throat injury exposing hyoid bone and floor of mouth

from the wound was done to prevent aspiration. After patients vitals were stabilized, they underwent a secondary survey which includes a complete history and a thorough

physical examination. These steps help to identify injury of other parts of body and to direct further treatment. In all patients cut throat injuries were assessed by assigning the injury to three anatomical zones of neck. Zone I extends from the cricoid cartilage to clavicle. Zone II is between cricoid cartilage and angle of mandible. Zone III is between angle of mandible and base of skull. During wound repair, first the wound was washed with normal saline thoroughly and then repaired in layers. Endotracheal intubation where possible was done. Otherwise an emergency tracheostomy was done below the level of injury. Wound was explored and bleeding points were ligated or coagulated. Ryle's tube was inserted in those cases where cut injury involved hypopharynx. In patients where the injury involved the thyro-hyoid membrane, repair was done by suturing thyro-hyoid membrane with perichondrium of thyroid cartilage with 3-0 prolene. In patients with involvement of thyroid cartilage repair was done by approximating the cut ends with 3-0 prolene. In patients with cricothyroid membrane injury, cut ends were sutured with 3-0 prolene. In patients with cricoid cartilage injury, approximation of the cut ends was done by suturing the perichondrium with 3-0 prolene. In cases of transected trachea, it was sutured circumferentially with interrupted 3-0 prolene at an interval of 3–4 mm. For injury of hypopharynx we used extra-mucosal sutures with 2-0 vicryl. Fascia, muscles and subcutaneous tissue of the neck were sutured with 2-0 vicryl in layer by layer. Skin was closed with 2-0 silk after keeping rubber drain. Post operatively patients were strictly advised not to extend the neck, as it may result in wound dehiscence. Feeding was taken care of through the Ryle's tube. Broad spectrum antibiotics were given to prevent infection. Regular dressings were done. Sutures were removed after 7 days. After discharge of the patients, follow up was done for 6 months along with endoscopic examination of the airway. Psychiatrist consultation was taken in all cases.

Results

Among 22 patients there were 18 male and 4 female. The peak age of incidence was in the 4th decade of life (40.91%) (Table 1). Suicidal (50%) cut throat injury was the most common mode of injury followed by accidental (40.91%) (Table 2). Motives behind suicidal cut throat injuries were depression, interpersonal conflict, low socio-economic condition, substance abuse and family abuse. Motives behind homicidal cut throat injuries were robbery, land dispute and interpersonal conflict. Accidental cut throat injuries occurred due to road traffic accident or fall from height. Most of the cut throat injuries were in the zone II (72.73%) (Table 3). All patients presented with open

Fig. 3 Homicidal cut throat injury in an infant dividing thyroid cartilage

Fig. 4 Immediate post-op picture of repair of cut throat injury

wound, 20 of them had active bleeding, 12 patients had respiratory distress, 3 patients were in haemorrhagic shock (Table 4). Skin, soft tissues, small vessels were injured in all patients, hypopharynx in 9 patients, larynx in 10

Table 1 Distribution of patients according to age

Age in years	No	Percentage
≤20	1	4.55
21–30	5	22.73
31–40	9	40.91
41–50	3	13.64
51–60	2	9.09
61–70	2	9.09

Table 2 Distribution of patients according to mode of injury

Mode of injury	Motivating factor	No	Percentage
Suicidal		11	50
	Depression	4	18.18
	Interpersonal conflict	2	9.09
	Low socio-economic condition	2	9.09
	Substance abuse	2	9.09
	Family abuse	1	4.55
Homicidal		3	13.64
	Robbery	1	4.55
	Land dispute	1	4.55
	Interpersonal conflict	1	4.55
Accidenta		9	40.91
	Road traffic accident	6	27.27
	Fall from height	2	9.09

patients, thyroid gland in 3 patients, trachea in 2 patients, great vessels in 2 patients, recurrent laryngeal nerve in 2 patients (Table 5) (Figs. 1, 2, 3). Seven patients presented late (after 12 h after injury) (Table 6). Simple wound closure was done in 8 patients, repair of hypopharynx in 2 patients, tracheostomy followed by repair of larynx in 3 patients, tracheostomy followed by repair of larynx and hypopharynx in 7 patients, tracheostomy followed by crico-tracheal reconstruction in 2 patients, ligation of great vessels in 2 patients (Fig. 4). Blood transfusion was needed in 7 patients. All of them were consulted with psychiatrist (Table 7). Wound haematoma occurred in 1 patient, wound infection in 2 patients, ugly scar in 2 patients, temporary pharyngo-cutaneous fistula in 2 patients, persistent mild dysphagia in 3 patients (Figs. 5, 6, 7). Three patients had permanent tracheostomy and 4 patients had permanent change of voice. Three patients died due to severe haemorrhage and/or aspiration (Table 8). Wound haematoma and temporary pharyngo-cutaneous fistula subsided with conservative management. Wound debridement with secondary suturing was done in cases of wound infection. Scar revision was done in cases of ugly scar. There were two

Table 3 Distribution of patients according to anatomical zones of injury

Anatomical site	No	Percentage
Zone-I	2	9.09
Zone-II	16	72.73
Zone-III	4	18.18

cases of laryngeal stenosis and one case of tracheal stenosis, which occurred due to severe mutilation of tissues. All of them were treated with laryngotracheal reconstruction later on. Decannulation was possible in 9 out of 12 patients.

Discussion

According to world Health Organization (WHO), every year over 5 million people around the world die as a result of cut throat injury. As per WHO, it is estimated that for every death 10–20 gets hospitalized and 50–100 receives emergency care, indicating the enormous burden on the resources of the country [12, 13]. Management of cut throat injury is a challenging task as the most important organs like larynx, trachea, pharynx, carotids and nerves are present in a small confined area [1]. In this study, age incidence of the victims were 10 days to 68 years. Most of the patients were males in their fourth decade of life, a finding which agrees with the literature [3–5]. Aich et al. [14] studied 67 cut throat injuries; 47 were males and 20 were females. The majority of victims (61.19%) were young adults between 21 and 30 years of age, 77.61% were from rural community, and 79.10% belonged to the low socioeconomic class. Male preponderance in this age group is due to their active participation in risky behaviours and their frequent involvement in interpersonal conflicts. This has great economic setback since these are people who are the major bread winners for their family. Their most productive years are lost in the sufferings and the injuries impose a considerable burden on their families and the society as a whole [15]. In our study the most common motivating factor behind cut throat injury was suicidal, which is in contradiction to the observation of Modi and Pandey [13]. They observed that suicidal cut throat injuries are rare in India. In contrast, suicidal cut throat injuries were the most common cause in the western population [16, 17]. Psychiatric illness was the most frequent cause for suicidal attempts. Similar finding was also reported in Bangladesh by Manilal et al. [4]. In our study males outnumbered the females among the victims of suicidal cut throat injuries. Another study noted that the suicidal cut throat injuries were more frequent in men than in women

Table 4 Distribution of patients according to presentation at the time of admission

Presentation	No	Percentage
Open wound	22	100
Active bleeding	20	90.91
Hemorrhagic shock	3	13.64
Respiratory distress	12	54.55

Table 5 Distribution of patients according to structures injured

Structure injured	No	Percentage
Skin, soft tissues, small vessels	22	100
Hypopharynx	9	40.91
Larynx	10	45.45
Thyroid gland	3	13.64
Trachea	2	9.09
Great vessels	2	9.09
Recurrent laryngeal nerve	2	9.09

Table 6 Distribution of patients according to delay in hospital arrival

Time of delay in hospital arrival	No	Percentage
<6 h	3	13.64
6–12 h	12	54.55
13–24 h	5	22.73
>24 h	2	9.09

Table 7 Distribution of patients according to treatment provided

Treatment provided	No	Percentage
Simple wound closure	8	36.36
Repair of hypopharynx	2	9.09
Tracheostomy followed by repair of larynx	3	13.64
Tracheostomy followed by repair of larynx and hypopharynx	7	31.82
Tracheostomy followed by crico-tracheal reconstruction	2	9.09
Ligation of great vessels	2	9.09
Blood transfusion	7	31.82
Psychiatric consultation	22	100

[18, 19]. According to Roon and Christensen's classification, neck injuries are divided into three anatomical zones [1]. The predominance of Zone II injuries in our study is attributable to the fact that unlike Zones I and III, Zone II is not protected by bony structures making it more vulnerable to injuries. Injuries in this zone are the easiest to expose in

Table 8 Distribution of patients according to complications

Complication	No	Percentage
Wound haematoma	1	4.55
Wound infection	2	9.09
Ugly scar	2	9.09
Temporary pharyngo-cutaneous fistula	2	9.09
Persistent dysphagia	3	13.64
Permanent voice change	4	18.18
Permanent tracheostomy	3	13.64
Death	3	13.64

Fig. 5 Healed scar of cut throat injury and tracheostoma site

cut throat injury [4–6, 20]. As reported by others, majority of patients in our study presented with open wounds and active bleeding [3, 4]. Iseh et al. [21] suggested that pharyngeal, hypopharyngeal and laryngeal mucosal lacerations should ideally be repaired early within 24 h. In our study we found that those who attended emergency early (within 12 h) and repaired within 24 h, treatment outcome were better. The chance of wound infection and pharyngo-cutaneous fistula rises with delayed repair. Poor communication, inadequate first-aid knowledge and facilities, and lack of skilled manpower were responsible for delayed presentation to the hospital. Regarding the involvement of the deep structures of the neck larynx (45.45%) and hypopharynx (40.91%) were the common organs. Two victims had the internal jugular vein injury, who presented with massive bleeding and hypovolemic shock. Both of

Fig. 6 Wound haematoma after repair of cut throat injury

them died inspite of ligation of internal jugular vein. The worth of tracheostomy in the management of cut throat injury has been highlighted in the literature [8, 9]. In our study total 12 (54.55%) victims required tracheostomy. Regarding treatment outcome some patients are living normal life after treatment, some patients are living with minor disability like change of voice and mild dysphagia. Laryngeal stenosis, pharyngeal stenosis and pharyngocutaneous fistula are the worst complications [22]. In our study two patients had laryngeal stenosis and one patient had tracheal stenosis. Pharyngo-cutaneous fistulae can be avoided by meticulous suturing of tissue layers, re-enforcing each other, avoiding overlapping of suture lines and choosing correct suture material. They can be prevented by Ryle's tube feeding and avoiding oral feeds, in the post-operative period [23]. All patients who have attempted suicide should undergo a psychiatric evaluation. This is because the act of suicide is a sign of an underlying mental illness and there may be a possibility of a second attempt. Victims of homicidal cut throat injuries also need psychological support to overcome the trauma to their psyche,

Fig. 7 Temporary pharyngo-cutaneous fistula following repair of cut throat injury

which may remain long after the neck wounds have healed [4, 24].

Conclusion

Incidence of cut throat injuries and associated morbidities & mortalities are increasing in a fast rate in our society. Suicidal cut throat injuries have become a major cause of morbidity and mortality among young males in our society due to psychiatric illness caused by high rates of unemployment, poor socioeconomic status, poor education, poverty and substance abuse. The timely and correct management knowhow is essential for a successful outcome. Those patients presenting with injury involving the larynx or upper trachea need preliminary tracheostomy. This will enable the surgeon to undertake primary closure of the wound and in addition the actual site of wound gets rest necessary for early healing. The patient's alimentary needs are better managed with Ryle's tube feeding. Post-operative endoscopy identifies the nerve injuries and stenosis problems. It is important to record protocols used and correct operative findings for medico-legal purpose and future reviews. Addressing the root causes of violence such as poverty, illiteracy, unemployment and substance abuse will reduce the incidence of cut throat injuries in our society. Morbidity and mortality among injured patients could be reduced by increasing the emergency health care services, ambulance system, pre-hospital care.

Compliance with Ethical Standards

Conflict of interest None.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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