

## **A Case of Ligature Strangulation in an Agricultural Accident with Unusual Autopsy Findings.**

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**Abstract:** *In India, there have been frequent incidents of accidental strangulation due to entangling of drapes used in the traditional attire of females like saree, chunni/dupatta, shawls, stoles, scarf etc during transportation, motorized machinery and instruments at workplace, factories, and home equipment. We report case of a female victim of accidental strangulation when her dupatta got entrapped in the water pump motor used for irrigation purpose in fields. During autopsy unusual postmortem findings were noted after which previous similar reported cases were studied and it was found that there exists a pattern of external and internal injuries in accidental ligature strangulation cases, which is not mentioned in the standard textbooks. The authors also intend to increase the awareness among the Indian population about the care and precautions while wearing these traditional drapes in vicinity of motorized equipment or machinery and bring to the notice of government authorities to frame make stringent safety guidelines like installation of safety guards in motorcycle/rickshaws, motorized farm and factory equipment etc.*

**Keywords:** *Farm accident, Ligature strangulation, Agricultural hazards, Cervical Fracture, Drapes.*

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### **INTRODUCTION**

In India many types of drapes are used in the traditional attire of females like saree, chunni/dupatta, shawls, stoles, scarf etc. Shawls and mufflers are also used by males during winter season. There have been frequent incidents of accidental strangulation due to entangling of these drapes during transportation, and in the motorized machinery, equipments and instruments at workplace, factories, and home equipments [1-6]. Very rarely these incidents occur in agricultural setup [7-9]. India is predominantly an agricultural country and in the year 2013, it contributed 13.7% in the Gross Domestic Product of the country and is the source of livelihood for 50% of Indian population [10]. There has been a shift in the trend in agricultural industry with increase use of machinery and mechanised equipments dominating the hand based labour. The increased use of machines though helps the farmers in increased yield but has also led to increase in the number of agricultural accidents [11]. We report a case of accidental strangulation of a teenaged when her dupatta got entrapped while working in her farm in a water pump motor which was being used for irrigation purpose of crops. Strangulation deaths due to ligature are usually homicidal and accidental cases are unusual with suicidal cases being rare [12-17]. In such accidents, finding the manner of the death is a challenge to autopsy surgeon and expertise comes into play as to carefully analyze the associated injuries with the history and overall circumstances.

### **CASE HISTORY**

The deceased was a young girl of rural region of western Uttar Pradesh about 100 km away from Delhi and was admitted in VMHC and Safdarjung Hospital, New Delhi with history of getting

accidentally strangled when her dupatta (A soft, long, broad collapsible garment similar to a stole or scarf which is a part of the traditional Indian dress –“Salwar Kameez”) got entrapped in the water pump motor. The water pump motor was installed on a well and was being used for irrigating the crops (**Image-1: sample picture of a pump used over wells in villages**). She was working in her farm along with her family members who rushed her to a local hospital where she was referred to a higher centre for treatment in New Delhi. She succumbed to death after four days of treatment in Safdarjung Hospital.



**Image 1:** Sample Picture of a pump used in villages to extract water from well

## AUTOPSY FINDINGS

The deceased was a seventeen years old female with average built with mud stains present over back. The following external injuries were noted:

1. Reddish brown scabbed abraded ligature mark was present incompletely around the neck placed just above the level of thyroid cartilage. The mark was placed anteriorly in midline 6 cm below chin 2.5 cm in width. On left side mark was going obliquely upwards and backwards, 3.5 cm below left angle of mandible 2.0 cm in width, further going upwards to mastoid area and disappearing in hairline thereafter. On right side, ligature mark was going horizontally backwards 4.5 cm below right angle of mandible, 1.5 cm in width, further going backside faintly up to nape of neck 6 cm below occipital protuberance 1.5 cm in width and disappearing in hairline thereafter.
2. Stitched lacerated wound 9 cm x 1 cm x bone deep, was present over right side of head extending from the frontal to parietal region.
3. Stitched lacerated wound 3.0 cm x 2.0 cm x bone deep, was present over left temporal region.
4. Brownish scabbed abrasion 5.0 cm x 3.0 cm was placed horizontally over left forehead just above left eyebrow.
5. Incised wound 2.0 cm x 0.5 cm x bone deep was present vertically between two eyebrows.
6. Brownish scabbed abrasions of size 2.0 cm x 0.5 cm and 2.5 cm x 1.0 cm were present over the outer aspect and inner aspect of right upper eyelid respectively.
7. Brownish scabbed abrasion 3.0 cm x 2.0 cm was present over left cheek at the zygomatic process.
8. Lacerated wound 0.5 cm x 0.3 cm x muscle deep was present over middle of upper lip.
9. Brownish contusion 3.0 cm x 2.0 cm was present over inner aspect of middle and right side of upper lip.
10. Lacerated wound 2.0 cm x 1.0 cm x muscle deep, vertically placed was present over 2 cm below middle of chin surrounded by brownish abrasion of size 3.0 cm x 2.0 cm.

On internal examination of neck, hemorrhage was present in the tissues and muscles of larynx on left side and on posterior aspect, beneath ligature mark. The hyoid bone and laryngeal cartilages were intact and trachea was congested. Cervical vertebra C2 was fractured and underlying spinal structures were edematous. Extravasation of blood was present over right fronto- parieto- temporal region of scalp. Fracture in right supraorbital area was present over skull. Brain was congested and edematous. Sub-arachnoid hemorrhage was present over bilateral occipital lobes and cerebellum. Petechial hemorrhage was present over corpus callosum and white matter. Both lungs were congested and petechial hemorrhages were present over interlobar surface at places. Petechial hemorrhages were present over apical surface of heart and coronaries were patent. The other internal findings were nonspecific.

## **DISCUSSION**

In the present case, few unusual postmortem findings were noted which are generally not found in such accidental ligature strangulation cases. The mark on the neck of the deceased was incomplete, going obliquely upwards, characteristically found in hanging cases, whereas the mark in strangulation cases is said to be horizontal and complete [12-17]. This created a doubt about the alleged history and manner of death. The mark in the strangulation can be oblique like hanging if the victim had been dragged [14]. Similarly in the current case, the unusual presentation of ligature mark is due to the pull of free ends of dupatta in water motor. The previous literature had also reported the mark to be incomplete [2, 6, 7, 9] and oblique [3]. There were too many associated external injuries present over the face and forehead, unlike hanging in which external injury other than the ligature mark is rarely found [12-17]. The accidental ligature strangulation cases have found to be having associated external injuries particularly over upper parts of body [2-5, 8].

The deceased had cervical fracture at C2 vertebra, which was similar to Hangman's fracture found in Judicial hanging due to sudden jerk to the neck [16]. The deceased was pulled suddenly towards the water motor leading to fracture of cervical vertebra. Tumaram [5] and Bardale [6] found fracture of cervical vertebrae in their cases. Jain et al [18] found 12 cases of cervical spine injuries due to dupatta entanglement. The victim in the present case survived for 4 days after the incident. This is due to the fact that the strangulation incident was witnessed by her parents who immediately rescued her preventing an instantaneous death. In the earlier reported cases also, survival upto few hours to six days have been reported when the strangulations happened in front of other people [2, 5, 6, 7, 9].

Thus we can conclude that the accidental ligature strangulation cases may have an incomplete and oblique ligature mark with high probability of external injuries over face and forehead and a high chance of delayed death after initial survival. The cervical vertebrae fractures can also be found in these cases, a finding which is not mentioned in the current literature.

The authors also intend to increase the awareness amongst the Indian population about the care and precautions that need to be taken while wearing these traditional drapes in vicinity of motorized equipments or machinery. The government authorities should make stringent safety guidelines like installation of safety guards in motorcycle/rickshaws, motorized farm and factory equipments etc.

## **Compliance with Ethical Standards**

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Conflict of Interest: There is no conflict of interests of any of the author.

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