



## Observation of the Carotid Arteries in Cases of Hanging

### KEYWORDS

Hanging, carotid artery, intima

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**ABSTRACT** *Hanging has been most common form of violent asphyxial death be it suicidal, homicidal or accidental. Present work is an attempt to study the gross and histo pathological changes in the carotid arteries in cases of hanging. Specimens of carotid arteries were collected from 54 cases of hanging. The collected specimens were subjected to gross external and histo pathological study. Out of 54 cases studied, only one case showed tear in the intima of the external carotid artery. The ligature material used in this case was a thin nylon rope where as in most of the cases the ligature material constituted of soft materials. In the present study it has been concluded that the gross and histo pathological changes in the carotid arteries in cases of hanging in domestic setup is a rare finding.*

### INTRODUCTION:

Hanging has been a common cause of unnatural death. It may be suicidal, homicidal or accidental.

Hanging is a form of violent asphyxial death, produced by suspending the body with a ligature around the neck, the constricting force being the weight of body or a part of the body weight.

Apart from various common external and internal postmortem findings, in cases of hanging changes in the carotid arteries are also inevitable.

In such cases there may be rupture of carotid sheath, tear in the intima of carotid arteries and effusion of blood into their walls, especially in cases of hanging where the victim hangs from a considerable height and the movement of the body is arrested by a sudden jerk of the ligature.

### AIM AND OBJECTIVE:

As such, in the present work an effort is being made to study the gross and histopathological changes in the carotid arteries in cases of hanging.

### NUMBER OF CASES:

Total fifty four cases of hanging were observed, out of which thirty were male cadavers while twenty four were female cadavers.

### PLACE OF WORK:

This study was carried out in the Department of F.M.T and the Department of Anatomy, R.I.M.S, Ranchi during January 2010 to December 2010.

### MATERIALS:

Material for the present study consists of the specimen of the carotid arteries obtained from the cadavers brought for autopsy in the Department of Forensic Medicine & Toxicology, Rajendra Institute of Medical Sciences, Ranchi.

### METHOD:

The victims were identified by the concerned constables and relatives. The history was obtained from the relatives regarding the circumstances and events leading to death.

Detailed postmortem examination as per protocol was done. Collection and preservation of specimen was done by careful dissection of neck. Upper border of the thyroid cartilage and ligature mark being used as landmark. Specimen of the carotid arteries from both sides of neck of the cadavers, who died due to hanging were collected and preserved in 10% formalin.

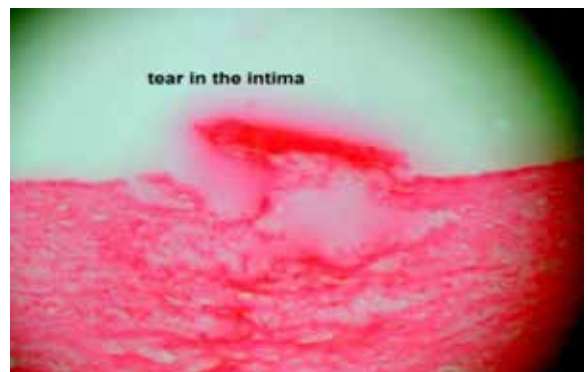
Specimen of the carotid arteries so collected were examined by the naked eyes and then with the magnifying glass for the presence of any external injury in the form of compression or constriction mark or tear in their wall.

Histopathological examination of the collected specimen was done by: Tissue processing, routine haematoxylin and eosin staining, observation under light microscope both low and high power.

### OBSERVATION:

On gross examination, in only one case out of fifty four cases of hanging we found that the wall of the external carotid artery under the ligature mark showed congestion.

On histological examination the intima layer of the external carotid artery in the same case showed tear at one site. In this case victim had used nylon rope as the ligature material and it was a case of typical hanging.



**Figure 1: Microphotograph showing tear in the intima of the external carotid artery in high power**



**Figure 2: Microphotograph showing tear in the intima of the external carotid artery in low power**

#### DISCUSSION:

C. J Polson cites the findings of experiments conducted by many workers who opine that the tension of 3 kg to 5 kg is enough to obstruct the jugular veins and the carotid arteries.

As per Modi, carotid arteries show laceration of the inner and middle coat and extravasation of the blood into their walls especially in cases of sudden drop from a height.

As per Nandy, ordinarily in few cases, the intima of carotid artery shows hyperemia in young individuals and tear of minor degree in elderly victims.

Dr. Dinesh Rao in his book stated that in 5 to 10% cases of hanging the intima of carotid arteries shows transverse split with extravasation of blood into their walls due to stretching and crushing.

Charoonsak Nualchaem MD, LLB Department of Forensic Medicine, BMA Medical College and Vajira Hospital in their study found that the tear in the intima of the common carotid artery was seen in only 3% cases of hanging.

D. C Simes mentioned that the traction on arterial structure can lead to intimal damage and subsequent thrombosis and obstruction. Although it is a rare finding because autopsy of 101 cases of hanging failed to demonstrate any intimal tear.

Noguchi K, Matsuoka Y, Hohda K, Nishimura S Department of Neurosurgery, Hayashi Hospital, Osaka, Japan reported a case of 50 year old woman with traumatic dissection of the right common carotid artery secondary to attempted suicidal hanging. Angiographic study demonstrated approximately 80% stenosis of the right common carotid artery. The histological findings revealed dissection of the medial layer of the arterial wall.

In our study over 54 cases of hanging, we also found that in only one case there was congestion of the wall of the external carotid artery and in same case there was tearing of the intimal layer of the external carotid artery.

#### CONCLUSION:

In our study we also came to a conclusion that in cases of hanging that we come across during postmortem examination in our setup, the incidence of tear of the intimal layer of the carotid arteries is a rare finding.

It may be so because in most of the instances of hanging in our part of country the ligature material used is usually a soft cloth or fibre rope and moreover, the height of suspension, used for the purpose being less.

Most of the cases of hanging are suicidal in nature usually happening in the domestic setup.

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