

A Medico Legal Study of Hanging Cases at Dhaka Medical College

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Abstracts :

This retrospective study was conducted among 574 Autopsy cases of hanging victims at the Dhaka Medical College Morgue during the period January 2008-December 2009.

Objective : The objective of this study was to find out the physical characteristics, cause, place as well as the injuries specially in neck structures, variation of ligature materials, ligature marks, position of knot in the study subjects.

Methods : A total of 5114 autopsies were performed during the study period, out of which 574(11.22%) were hanging cases. Ligature strangulation and manual strangulation cases were excluded from this study.

Various Data of this hanging victims regarding places of incidence, time, suspected causes of death (related information were gathered from the victims attendants), type of suspension were noted from the inquest report accompanying the dead bodies. Points regarding ligature material, position of knot, pattern of ligature marks, injury to neck structures, fracture of hyoid bone and thyroid cartilages were collected from the 3rd copy of post mortem reports preserved in the Forensic Medicine & Toxicology Department of DMC. Finally data were analyzed and presented in table, graph and in pie chart.

Results : Out of 574 hanging cases female were predominant (72.29%). Among them 304(52.96%) were married. Marital disharmony/quarrel between couples was the main cause 172(29.96%) of hanging. Most of the victims 269(46.86%) were in the age group 21-30 years. Dopatta (orna) was the commonest 237(41.28%) ligature material. Considering the knot, most were situated at right side of neck 281 (48.95%). In this study single ligature mark has been found in 511(89.02%) cases and was non continuous in 478(83.27%) study subjects. In 520(90.59%) cases ligature was found above thyroid cartilage level. The mark was oblique in 509(88.68%) cases and impression corresponding to ligature material found in 126(21.95%) cases. Considering injury to neck structures most of them 448(78.04%) had stretching and elongation of neck, haemorrhage in underlying layers of neck skin in 372(64.81%). Injury to the other structures of neck were variable. Most of the victims 401(69.86%) hanged themselves at night. 545 body (94.95%) were recovered from inside the living room.

Most victims had complete suspension 472 (82.23%).

Conclusion : This retrospectivemedico legal study find out various data of hanging victims of one of the largest health care center, Dhaka Medical College, which cover a large area of population. Though multi center prospective study should be carried out to find out our real situation.

Key Words : Hanging, Autopsy, Neck structure injury.

Introduction

Hanging, the most common method of suicide is a form of violent asphyxial death in which the body is suspended by a ligature material which constricts the neck structures and prevents entry of air into lungs, the constricting force being the weight of the body¹. It produces painless death for the victims and there is no costs involvement other than that of the ligature material. A thin jute rope around the neck will cause unconsciousness in 15 seconds³. So the people prefer it as a common method of suicide in our country. These methods are also followed in other south Asian countries⁴⁻⁵. A good number of people commit suicide each year, making it one of the 10 leading causes of death in the world accounting more than a million death annually⁶. Even in developed countries like Serbia, Norway or Hungary suicide by hanging cases are commonly found.⁷⁻⁹ In England and Wales hanging is the commonest method of suicide, accounting 2000 deaths each year.¹⁰

During hanging the body completely suspends from above without touching the ground, which is called complete hanging, sometimes some parts of body touches the ground, this is called incomplete or partial hanging². The position of knot in neck is very important because it can cause unequal pressure on the neck resulting different injuries to neck structures. In complete hanging injuries are more than partial hanging, where the body weight is supported by ground.

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Fracture of hyoid bone and thyroid cartilage are of important pathogenesis to forensic specialists specially when death is caused by neck constriction in hanging or manual constriction or homicide by strangulation.

Materials and method

This retrospective study was conducted among victims of hanging at the Dhaka Medical College Morgue during the period January 2008- December 2009. Various data of the victim along with places of incidence, time, suspected causes of death, type of suspension and other related information were gathered from the victim's attendants were noted from the inquest report accompanying the dead bodies. Points regarding ligature material, position of knot, pattern of ligature marks, injury to different neck structures (fracture of hyoid bone and thyroid cartilages were determined by visual and palpatory method) etc were noted during post mortem examinations.

Therefore all data related to these were collected from the 3rd copy of post mortem reports preserved in the Forensic Medicine & Toxicology Department of Dhaka Medical College. Ligature strangulation and manual strangulation cases were excluded from this study. Finally all data were analyzed and presented in table, graph and in pie chart.

Results

Out of 574 hanging cases female were predominant (72.29%). Male were 9(27.71%). Among them 304(52.96%) were married and 270(47.04%) were unmarried. Marital disharmony/quarrel between couples was the main cause 172(29.96%) behind hanging. Other causes were Mental depression, Drug addiction, Failure in love affairs, Unwanted pregnancy, Incurable disease, Mentally imbalance and Various family problems (Table-I).

Table-I : Suspected causes of hanging (n=574)

Suspected causes of hanging	Total
Marital disharmony/ quarrel between couples	172(29.96%)
Various family problems	85(14.81%)
Mental depression	77(13.42%)
Drug addiction	65(11.32%)
Failure in love affairs	47(8.19%)
Unwanted pregnancy	37(6.44%)
Incurable disease	23(4.01%)
Mentally imbalance	17(2.96%)
Unknown causes	51(8.89%)

Most of the victims 269(46.86%) were in the age group 21- 30 years (Fig-1).

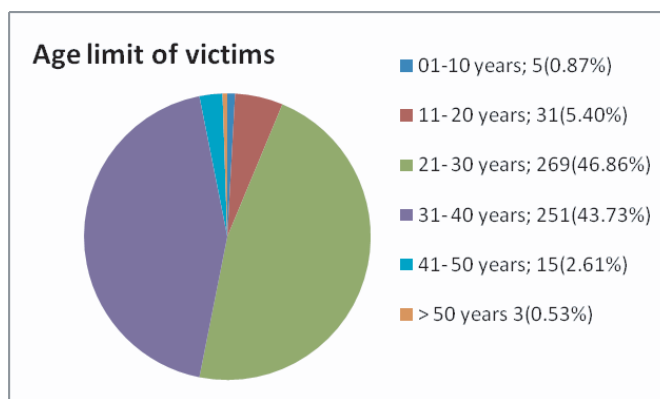


Fig-1 : Variation of age of hanging victims (n=574)

Dopatta (orna) was the commonest 237(41.28%) ligature material followed by jute rope 195(33.97%) and shari 42(7.32%) (Table-II).

Table-II : Ligature materials used for hanging (n=574)

Variation of ligature materials	Total
Orna (dopata)	237(41.28%)
Jute rope	195(33.97%)
Shari	42(7.32%)
Nylon rope	28(4.88%)
Lungi/ dhuti	25(4.35%)
Kamiz	21(3.68%)
Electric wire	03(0.52%)
Other materials	23(4.00%)

Considering the knot, most were situated at right side of neck 281 (48.95%), followed by left side 235 (40.94%), at the nape of neck 50(8.71%) and in front of neck below chin 8(1.39%) (Fig-2).

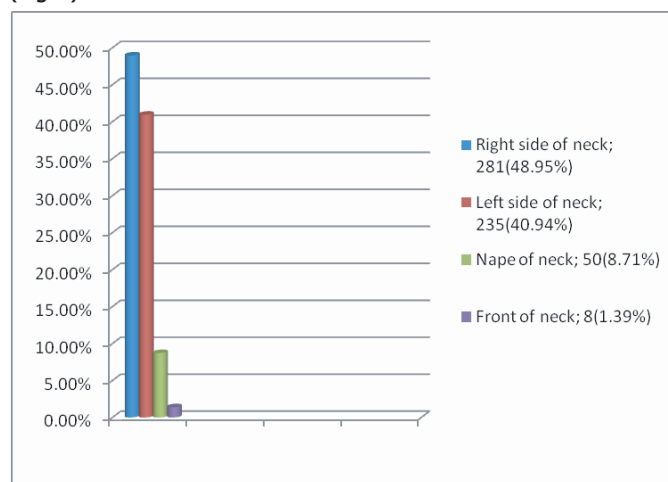


Fig-2 Position of Knot of ligature (n=574)

Most of the study subjects were right handed. In this study single ligature mark has been found in 511(89.02%) cases

followed by double ligature mark 17(2.96%) and very faint 31(5.40%). Ligature mark was completely absent in 15(2.62%) cases. The mark was continuous in 50(8.71%) and non continuous 478(83.27%) study subjects. In 520(90.59%) cases ligature was found above thyroid cartilage level, 28(4.88%) had marks at thyroid cartilage level and 11(1.92%) had marks below thyroid cartilage level.

The mark was oblique in 509(88.68%) cases and transverse in 50(8.71%). Impression corresponding to ligature material found in 126(21.95%) cases (Table-III).

Table-III: Variation of ligature marks in neck (n=574)

According to loop

Single	511(89.02%)
Double	17(2.96%)
Very faint	31(5.40%)
Marks absent	15(2.62%)

According to marks

Continuous	50(8.71%)
Non continuous	478(83.27%)
Very faint	31(5.40%)
Marks absent	15(2.62%)

According to level

Above thyroid cartilage	520(90.59%)
At the level of thyroid cartilage	28(4.88%)
Below level of thyroid cartilage	11(1.92%)
Absent	15(2.61%)

According to Position

Oblique	509(88.68%)
Transverse	50(8.71%)
Absent	15(2.61%)

According to ligature material imprint

Present, corresponding to ligature material	126(21.95%)
Absent	433(75.44%)
Imprint not found	15(2.61%)

In this study complete suspension were 472 (82.23%) victims and 102 (17.77%) were partial hanging. Considering injury to neck structures stretching and elongation of neck was found in 448(78.04%) cases, haemorrhage in underlying layers of neck skin in 372(64.81%), haemorrhage in strap muscles were seen in 162(28.22%), rupture of platysma and sternocleido mastoid muscles in 66(11.49%) cases, transverse split of carotid artery intima with extravasation of blood in 27(4.70%), rupture of vertebral arteries with intimal tear and sub intimal haemorrhage in 15(2.62%) cases, fracture of thyroid cartilage in 2(0.35%), petechial haemorrhage in epiglottis, larynx, trachea in 16(2.78%), congestion of trachea 568(98.95%) and fracture of hyoid bones in 81(14.11%) cases (Table-IV).

Table-IV: Injury to neck structures (n=574)

Same victim showed multiple types of injury*

Types of neck structures injury	Location and percentage
Stretching and elongation of neck	448(78.04%)
Haemorrhage in underlying layers of neck skin	372(64.81%)
Haemorrhage in strap muscles	162(28.22%)
Rupture of platysma and sternocleido mastoid muscle	66(11.49%)
Transverse split of carotid artery intima with extravasation of blood	27(4.70%)
Rupture of vertebral arteries with intimal tear and sub intimal haemorrhage	15(2.62%)
Injury to trachea, fracture of thyroid cartilage	Nil
Petechial haemorrhage in epiglottis, larynx, trachea	2(0.35%)
Congestion of trachea	16(2.78%)
Fracture of hyoid bones	568(98.95%)
	81(14.11%)

Most of the victims 401(69.86%) hanged themselves at night. 545 body (94.95%) were recovered from inside the living rooms.

Discussions

Exact number of suicidal deaths by hanging in Bangladesh are not known but in our neighboring country India, every 5 minutes a person commits suicide, 7 attempts to kill themselves forming around 100,000 suicide death per year; either by hanging or ingestion of insecticides or barbiturate tablets.¹³ A five year study (1998- 2002) in Turkey also showed that hanging is the commonest method of suicide in Istanbul.¹⁴ A study in Lithuania has shown that a total of 8324 suicides were committed during 1993- 1997 and 7823 between 1993-2002. Among all these registered suicides cases, hanging was the commonest method used to commit suicide.¹⁵

In this study out of 574 hanging cases, 159 (27.71%) were male and 415 (72.29 %) female. Among them 304(52.96%) were married and 270(47.04%) were unmarried. Marital disharmony/quarrel between couples was the main cause 172(29.96%) found for suicidal hanging.

In this study most of the victims 269(46.86%) were from the age group 21- 30 years. Study has shown that people belong to this age group are also common victims of hanging in other countries.¹⁶⁻¹⁹ These young groups committed suicide mainly due to emotional instability, mental depression 77(13.42%), drug addiction 65(11.32%), failure in love affairs 47(8.19 %) and unwanted pregnancy 37(6.44%). In both developed and developing countries the suicide rate among young people appear to be rising. Peer pressure and emotional issues are the triggering factors.²⁰

Most of the victims 401(69.86%) hanged themselves at night. 545 body (94.95%) were recovered from inside the living rooms.

A number of victims committed suicide at late night, inside the room where none remains to resist them from suicidal behavior. Davidson et al²¹ in his study had shown that home (74.1%) was the commonly preferred place for suicidal hanging. Bowen²² in his study also showed most of suicidal hanging took place inside home.

Dopatta (orna) was the commonest 237(41.28%) ligature material followed by jute rope 195(33.97%) and shari 42(7.32%). Sharma et al in his study between 1997 to 2004 at Chandigarh Govt Medical College & Hospital, India showed that chunni (orna) was the commonest(30.90%) ligature material followed by nylon rope (18.18%), bed sheet (16.36%). and jute rope (12.73%).²³ A study in our neighboring country Nepal done by Pradhan A during January 2007 to April 2008 has shown that maximum people used rope (47.72%) followed by shawl (31.81%) shari (9.09%) and woolen muffler(4.54%).²⁴

The victims hang themselves from ceiling fan, ceiling hook, pipe of bathroom, beams, girder etc using a chair or table or tool as the base for standing, later on push them away by feet . In the outdoor cases branch of a tree, light post etc are commonly used as the point of suspension. In western countries belt, electric cable, scarf, tie, dressing gown cord, shoe lace, curtain cord, telephone cord, shower lead etc are used as ligature materials, which are not so used in our country.²⁵

Considering the knot, most were situated at right side of neck 281 (48.95%), followed by left side 235 (40.94%), at the nape of neck 50(8.71%) and in front of neck below chin 8(1.39%). Knot on right side of neck is commonly available for right hand users, who are more abundant in our country than left hander. This coincides with studies done before by O P Saini in 2005 at S P Medical College at Bikener, India, which had shown that 15(45.45%) cases had knot on right side, 11(33.34%) cases had knot on left side and 7(21.21%) on other places of neck out of 33(100%) cases of hanging.²⁶ The knot is usually present in the form of a simple slip knot to produce running noose or fixed by granny or reef knot, occasionally a simple loop is used.¹

Ligature mark in the neck is the principal external sign in hanging that requires very meticulous inspection. In this study single ligature mark has been found in 511(89.02%) cases followed by double ligature mark 17(2.96%) and very faint 31(5.40%). The mark was oblique in 509(88.68%) cases and transverse in 50(8.71%). In this study the ligature mark was continuous in 50(8.71%) and non continuous 478(83.27%) study subjects. Impression corresponding to ligature material found in 126(21.95%) cases. The ligature mark was completely absent in 15(2.62%) cases. Any intervening object like beard,

hair, neck tie, clothings if get tangles between neck and ligature material will not produce any marks on neck. Again soft broad ligature material like scarf, towel, produces faint marks. If someone is rescued soon after hanging the ligature mark may be absent¹.

In this study 520(90.59%) cases had ligature above thyroid cartilage level, 28(4.88%) had marks at thyroid cartilage level and 11(1.92%) had marks below thyroid cartilage level. This coincides with a study done by Reddy KSN, which showed that in 80% cases ligature marks situated above thyroid cartilage level between chin and larynx, in 15% cases at the level of thyroid cartilage and in 5% cases below the cartilage.¹

Considering injury to neck structures stretching and elongation of neck was found in 448(78.04%) cases. In hanging the neck is always stretched due to elasticity of neck muscles and vessels unless the body is removed soon after hanging. Haemorrhage in underlying layers of neck skin had been found in 372(64.81%) cases, haemorrhage in strap muscles were seen in 162(28.22%), rupture of platysma and sternocleidomastoid muscles in 66(11.49%) cases. Haemorrhage occurs due to direct trauma produced by ligature material and ruptured muscles indicates considerable violence, specially in long drop. Reddy in his study stated that haemorrhage may be present in 25% cases and rupture of muscles in 5- 10% cases, which coincides with our study.¹

Transverse split of carotid artery intima with extravasation of blood were found in 27(4.70%) cases and rupture of vertebral arteries with intimal tear and sub intimal haemorrhage in 15(2.62%) cases. These also occurs due to stretching and crushing of blood vessels in long drop and prolonged hanging. Fracture of thyroid cartilage seen in 2(0.35%) cases with petechial haemorrhage in epiglottis, larynx, trachea in 16(2.78%), congestion of trachea in 568(98.95%) and fracture of hyoid bones in 81(14.11%) cases. Reddy(2004) stated fracture in 10-20% cases, Nikolic S(2003) showed fracture in 68% cases, ApurvaNandy(2000) showed in 5-10% cases, Betz P(1996) showed in 67% cases, Wintraub(1961) found fracture in 27% cases and Reutor(1901) stated in 60% cases. But Modi(1988) stated that fracture of hyoid bones are rare. Whereas Smith and Foddes(1955) and Mukherjee JB(1994) had never found any fracture in their study.²⁷

Conclusion : This retrospectivemedico legal study find out various data of hanging victims of one of the largest health care center, Dhaka Medical College, which cover a large area of population. Though multi center prospective study should be carried out to find out our real situation.

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