



ROLE OF EXTERNAL INJURIES IN ASCERTAINING THE CAUSE OF DEATH IN CASE OF BODIES RETRIEVED FROM WATER

Forensic Medicine

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ABSTRACT

Background: Injuries present on body retrieved from water, may complicate the case as it creates the suspicion and difficulties in deciding cause of death apart from drowning and force to think about other possibilities. The injuries present on body may be ante-mortem, peri-mortem or post-mortem in nature.

Materials and Methods: The present study was undertaken at tertiary care hospital, Government Medical College and Hospital on 190 cases brought for postmortem examination, retrieved from different water sources during the period December 2013 to October 2015.

Result: The maximum incidence of cases retrieved from water was 53 cases in age group 21-30 years (27.89%) cases followed by 31-40 years (22.64%) cases and 41-50 years (19.47%) cases. In 190 cases retrieved from water, drowning as a cause of death ascertained in 149 cases (78.42%), Drowning with head injury was given as a cause of death in 5 cases (2.63%), Injuries to vital organs were given as a cause of death in 3 cases (1.58 %) and opinion was kept reserved in 33 cases (17.37 %). Abrasion was present in total 32 cases (16.84%), contusions were present in 8 cases (4.21%), laceration was present in 6 cases (3.15%) in which 4 cases, No injuries was present in 153 cases (80.52%)

KEYWORDS

Drowning, Head injury with drowning, homicidal drowning, submerged bodies.

Introduction:

Drowning is described in forensic medicine literature as one of the most difficult thing to diagnose.¹ 'Drowning' as a cause of death is given on the basis of signs that present on body, which can be clearly seen if the autopsy is carried out immediately after the retrieval of body from water but practically it is not possible to do the postmortem examination immediately after the retrieval of body, so as the time passes typical findings of drowning start to vanish. Many times the bodies may be present in water for several days and decomposition may have obscured or destroyed the features of drowning, so in those cases the findings of drowning may be minimal or completely absent; nevertheless careful postmortem examination may elicit sufficient positive and negative findings to allow reasonable conclusions to be drawn.² So, it is a great challenge before the autopsy surgeon, to do meticulous postmortem examination to reach the exact cause of death.

The 'vast majority of homicidal drowning' involve forms of violence such as 'beating' and stabbing etc.³ Careful evaluation of any injuries present is required in order to determine whether any could have been caused by assault during life. Injuries to the facial skeleton, neck (including larynx) or ulnar borders of the arms (suggestive of 'defensive' injuries), for example, should be excluded. It is not always possible, due to the effects of immersion, confidently to determine whether all or some of the injuries present are Ante-mortem, peri-mortem or post-mortem in origin. Marine animals/ fish may cause skin, soft tissue or skeletal damage that may sometimes cause interpretation difficulties⁴, and injuries caused by contact between the body and submerged objects, structures, rocks, gravel are frequently seen.

Material and methods:

The present Cross sectional study was carried out in the mortuary of Department of Forensic Medicine and Toxicology of this institution. The study includes, only the bodies which were retrieved from water sources, brought for post mortem examination during the period of December 2013 to October 2015. As per law of the land, consent is not required for carrying out the medicolegal postmortem examination. However, as per the prevailing mandatory standard procedures of the Institute; the prior permission cum no objection certificate to carry out the study was obtained from local ethical committee. Detailed history and relevant information was collected from police inquest and requisition (Panchanama). Necessary information was collected from relatives. Data entry was done using Microsoft excel worksheet and

Statistical Analysis with percentage and range was used to summarize baseline characteristic of the study subjects.

Results:

Table 1. Age and sex wise distribution of cases as per cause of death in bodies retrieved from water.

Age (In Years)	Male		Female		Total	
	Cases	%	Cases	%	Cases	%
0-10	3	2.19	7	13.21	10	5.26
11-20	14	10.22	5	9.44	19	10
21-30	42	30.66	11	20.75	53	27.89
31-40	35	25.55	8	15.09	43	22.64
41-50	27	19.71	10	18.87	37	19.47
51-60	6	4.38	8	15.09	14	7.37
61	10	7.29	4	7.55	14	7.37
Total	137	100	53	100	190	100

The age wise distribution of cases as per mentioned in table no.1 the maximum incidence of cases retrieved from water was 53 cases in age group 21-30 years (27.89%) cases followed by 31-40 years (22.64%) cases and 41-50 years (19.47%) cases. In males maximum incidence found in age group 21-30 years (30.66%) cases, Followed by 31-40 years (25.55%) cases. And in females maximum cases found in 21-30 years (20.75%) cases followed by 41-50 years (18.87%) cases. Female predominates male in age group 0-10 years and 51-60 years. Male as to female ratio in bodies retrieved from water was 2.58:1.

Table 2. Distribution of cases as per cause of death in bodies retrieved from water.

Cod	Cases				Total	%
	Male	%	Female	%		
Drowning	104	75.92	45	84.90	149	78.42
DrwHI	3	2.19	2	3.77	5	2.63
IVO	3	2.19	0	0	3	1.58
OR	27	19.70	6	11.33	33	17.37
Total	137	100	53	100	190	100

In 190 cases retrieved from water, drowning as a cause of death ascertained in 149 cases (78.42%), in which 104 cases (75.92%) were male and 45 cases (84.90%) were female. Drowning with head injury was given as a cause of death in 5 cases (2.63%), in which 3 cases

(2.19%) were male and 2 cases (3.77 %) were female. Injuries to vital organs were given as a cause of death in 3 cases (1.58 %) and opinion was kept reserved in 33 cases (17.37 %) in which 27 cases (19.70%) were male and 6 cases (11.33%) were female.

Table 3: Distribution of cases as per external injuries present on body (n= 190 cases)

Injuries	Cases				Total	%
	Male	%	Female	%		
Abrasion	22	16.09	10	18.86	32	16.84
Contusion	4	2.91	4	7.54	8	4.21
Laceration	4	2.91	2	3.77	6	3.15
None	115	83.94	43	81.13	153	80.52
Total cases	Male - 137	Female- 53	190			

In total 190 retrieved from water, injuries over body present in the form of abrasions, contusions and lacerations. The characters are overlapping as multiple injuries present in same individual. Abrasion was present in total 32 cases (16.84%) in which 22 cases (16.09%) were male and 10 cases (18.86%) were female, contusions were present in 8 cases (4.21%) in which 4 cases (2.91%) were male and 4 cases (7.54%) were female, laceration was present in 6 cases (3.15%) in which 4 cases (2.91%) were male and 2 cases (3.77%) were female. No injuries was present in 153 cases (80.52%)

Discussion:

Age and gender distribution of drowning deaths.

In present study, the maximum incidence of cases retrieved from water was 53 cases in age group 21-30 years (27.89%) cases followed by 31-40 years (22.64%) cases and 41-50 years (19.47%) cases. In males maximum incidence found in age group 21-30 years (30.66%) cases, Followed by 31-40 years (25.55%) cases. And in female maximum cases found in 21-30 years (20.75%) cases followed by 41-50 years (18.87%) cases. Female predominates male in age group 0-10 years and 51-60 years. Male as to female ratio in bodies retrieved from water was 2.58:1.

These findings are consistent with that of Auer A.⁵ (1990), Quan L. et al⁶(2003), Shetty B.S.K. et al⁷ (2007), Pathak A. et al⁸ (2009) and Anary S. et al⁹ (2010). The probable reason behind preponderance of 21-30 years age group in drowning is carelessness and adventurous nature usually seen in youngsters while swimming or doing recreational activities in or around water source leading to accidental deaths. This is followed by the age group of 31-40

However, Dietz P. et al¹⁰ (1974), Patetta M. et al¹¹ (1988), Shekhezadi A. et al¹² (2009) found the highest incidence of drowning deaths in 15-24 years of age group. Also Shetty M.¹³ (2005), Ranga Rao G. et al¹⁴ (2014) and Ambade V. N. et al¹⁵(2013) noted highest number of drowning deaths in age group of 31- 40 years, but Esiyok B. et al¹⁶ (2006) found the most number of drowning deaths young age group of 0-10 years.

As most of the submerged bodies float in prone position, with arms and legs hanging downwards, contact with the rough bed of the stream, river, lake or sea will produce abrasions maximal over forehead, backs of hands, knees and toes. Tides or currents may crush the body against fixed objects, such as rocks, bridges, quays, weirs, wharfs and piers or ships; propellers may also inflict considerable damage. Exposed skin may be bitten or chewed by fish, shellfish, and other marine life including aquatic mammals, and some creatures are able to gain access to skin below loose clothing. Occasionally, such large marine animals as sharks cause extensive lesions. Although not always artefactual, serious injuries may be sustained either before the water was reached (on projecting rocks, pier pilings, bridge supports and quaysides) or while entering the water, especially after falling or jumping from a considerable height. The force generated by the latter may be sufficient to rupture internal organs.

Distribution of cases as per cause of death in bodies retrieved from water.

In 190 cases retrieved from water drowning as a cause of death ascertained in 149 cases (78.42%), in which 104 cases (75.92%) were male and 45 cases (84.90%) were female. Drowning with head injury was given as a cause of death in 5 cases (2.63%), in which 3 cases (2.19%) were male and 2 cases (3.77 %) were female. Injuries to vital organs were given as a cause of death in 3 cases (1.58 %) and opinion

was kept reserved in 33 cases (17.37 %) in which 27 cases (19.70%) were male and 6 cases (11.33%) were female.

Distribution of cases as per external injuries present on body:

In total 190 cases injuries over body present in the form of abrasions, contusions and lacerations. The characters are overlapping as multiple injuries present in same individual. Abrasion was present in total 32 cases (16.84%) in which 22 cases (16.09%) were male and 10 cases (18.86%) were female, contusions were present in 8 cases (4.21%) in which 4 cases (2.91%) were male and 4 cases (7.54%) were female, laceration was present in 6 cases (3.15%) in which 4 cases (2.91%) were male and 2 cases (3.77%) were female. No injuries was present in 153 cases (80.52%)

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These are common, and may provide interpretational difficulties. As most submerged bodies float prone, with arms and legs hanging downwards, contact with the rough bed of the stream, river, lake or sea will produce abrasions maximal over forehead, backs of hands, knees and toes. Tides or currents may crush the body against fixed objects, such as rocks, bridges, quays, weirs, wharfs and piers or ships; propellers may also inflict considerable damage. Exposed skin may be bitten or chewed by fish, shellfish, and other marine life including aquatic mammals, and some creatures are able to gain access to skin below loose clothing. Occasionally, such large marine animals as sharks cause extensive lesions. Although not always artefactual, serious injuries may be sustained either before the water was reached (on projecting rocks, pier pilings, bridge supports and quaysides) or while entering the water, especially after falling or jumping from a considerable height. The force generated by the latter may be sufficient to rupture internal organs.²

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