Original Communication

Study of Causes of Death in Decomposed Bodies

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Abstract

After death, the tissues have to reach the food chain, which is brought by various processes. Decomposition changes in the body are the final stage of degradation of the corpse. But this can cause misinterpretation of antemortem findings. In order to assess the extent of these changes and assessment of cause of death in such cases, the extent of certainty etc. The present study was conducted from May, 2016 to October, 2018 at Department of Forensic Medicine, MMIMSR, Mullana. All 44 decomposed bodies during the study period were included in this study which comprised 11.6% of the total 379 cases brought for post-mortem examination to the department. Of the 44 cases, 20 (45.5%) were unidentified and rest 24 (54.5%) were identified. Male victims were predominant with a ratio 6.33:1. Maximum number of cases belonged to the age group 41-50 years (27.3%). The cause of death in majority of the victims was given as Drowning (31.8%), followed by head injuries (15.9%) whereas strangulation was responsible for 13.7% deaths. Viscera for chemical analysis was sent in 20.5%, histopathology and for both chemical analysis and histopathology, in 4.5% cases each. The maximum number of cases were encountered in the month of June (18.2%); followed by May (15.9%).

Keywords: Decomposed bodies, Cause of death, Profile

Introduction:

After the death of any human being, the tissues have to enter the food chain. This process is brought by chemical (mostly enzymatic) and bacterial reaction and by the action of predators. But this can lead to misinterpretation of medico-legally significant antemortem findings[1] or even reporting of wrong findings. Putrefaction of the corpse is one of the most important artefacts.[2] Decomposition changes in the body arethe final stage of degradation of
the corpse. These changes sets in after disappearance of rigor mortis wherein complex organic structures are broken down into simpler metabolites by the action of anaerobic bacterial flora and autolytic digestive action of intracellular enzymes outpoured during cellular death. As the stage advances, a series of visible changes take place in the body, including marbling, bloating of corpse (due to gases produced during anaerobic activity), peeling of skin, formation of blisters, loosening of nails, hairs and teeth, softening of internal organs and finally skeletonization. Similar changes occur in internal organs sequentially. A number of parameters affect this process, the most important factors being those of temperature, humidity, entry of air and light, clothing's, body distribution of fat, the cause and manner of death.[3,4]

During stage of decomposition, the corpse is attractive to a number of invader organisms during this phase including flies and other terrestrial habitants. Flies lay eggs in clusters at times and singly on other occasion in hairs, nostrils and body cavities completing their life cycle. During this process, they utilize human tissues as resources and feed upon them.[5]

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It is common to get dead bodies in a decomposed state for post-mortem examination recovered from water, railway track, closed rooms etc. During post-mortem examination of such cases, forensic experts are forced to give a reasonable opinion regarding the cause of death. "No opinion is better than poor opinion"[6] but still forensic experts are forced to comment on the same. We can easily identify some gross findings in most cases and in some case we can say certain findings were absent. Both being equally important in concluding about the manner and cause of death. For example, in railway death cases where there are multiple injuries of varying age; we have to comment on the ante mortem or post-mortem nature of the injuries. However, once the skin is peeled off due to decomposition, it becomes difficult to identify injuries like abrasions, which are of very crucial value in homicidal cases.[7]

This problem gets further aggravated and taxes the resources of most experienced forensic expert when the bodies are recovered in skeletonized form or in a mutilated state.[8] This mutilation may be intentional by the criminals in an effort to destroy all traces of identity or to facilitate disposal of the body.[9] In our country, a dead body can be mutilated and the soft tissues completely devoured by various animals and vultures in a very short span of time, when disposed off in isolated lonely places. Mass disasters like earthquakes, bomb explosions, air-crash, railway accidents, etc. are other common instances where bodies can be found in a mutilated state.[1] Establishing identification and the cause of death in such cases can become a Herculean task.

It has been said with a considerable measure of truth that the post-mortem examination reveals the disease and lesions that the person lived with, and not necessarily those that killed him. So, in these cases, after ruling out physical injury, one has also to rule out poisoning and other diseases. In order to do so, the usual viscera are sent for routine chemical analysis and histopathology, and an interim report is handed over to the police. The final opinion regarding the cause of death is given with incorporating the findings given by both the quarters. As far as possible, an attempt is made at giving a definite opinion; however, when this is not possible, "no definite opinion" is mentioned in the report as regards the cause of death and one should not venture to guess "some opinion", just for the sake of giving opinions.[1]

Materials and Methods

The present study was carried on the decomposed bodies brought for post-mortem examination to the mortuary of the Department of Forensic Medicine, M.M.I.M.S.R, Mullana, Ambala, from May 2016 to October 2018 that comprised the material for the study. Data regarding these cases was compiled from the post-mortem reports, inquest papers; detailed history elicited from the concerned police officials at the time of autopsy, etc. Visible greenish colour disclouration in right iliac fossa was taken as the sign for start of decomposition

Inclusion criteria:

- All decomposed bodies were included in this study

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Exclusion criteria:

- All the dead bodies which were not in the state of decomposition were excluded from the study

Results:

A total of 379 bodies were brought for post-mortem examination to the mortuary of the department during the period under study. Of these, decomposed cases comprised 11.6% (44 cases). Of these 44 victims, 20 (45.5%) were unidentified whereas rest 24 (54.5%) were identified. (Figure 1).

Males outnumbered females in ratio of 6.33:1 [Males - 38(86.4%) and Females - 6(13.6%)]. Victims ranged from new-born to 82 years old in males and 16 to 80 years old in females. Maximum number of cases belonged to the age group of 41-50 years (27.3%); followed by the age groups of 31-40 years & 21-30 years (22.7% each). The age groups of <10 years and >80 years accounted for the least number of cases, 2.3% each. (Table 1)

Figure 1: Unidentified and Identified decomposed bodies

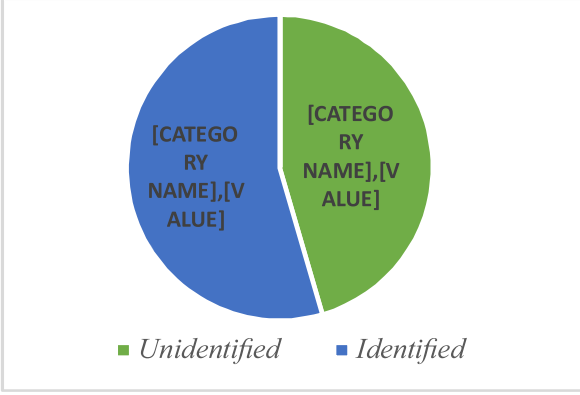


Table 1: Age-wise distribution of decomposed bodies

Age Group (yrs)	Male	Female	Total	%
<10	1	0	1	2.3
11-20	3	1	4	9.2
21-30	9	1	10	22.7
31-40	10	0	10	22.7
41-50	10	2	12	27.3
51-60	2	0	2	4.5
61-70	1	1	2	4.5
71-80	1	1	2	4.5
>80	1	0	1	2.3
Total	38	6	44	100

In majority of the cases, cause of death was opined as Drowning (31.8%) followed by head injuries in 15.9% cases. 13.7% cases were due to strangulation while hanging and multiple organ failure/ disease were responsible in 9.1% cases each. (Table 2)

Table 2: Cause of death-wise distribution

Sr. No.	Cause of Death	No. of Cases	%
1	Head Injury	7	15.9
2	Drowning	14	31.8
3	Hanging	4	9.1
4	Strangulation	6	13.7
5	No Definite opinion	2	4.5
6	Accident	1	2.3
7	Cardiac Disease	1	2.3
8	Multiple organ failure/disease	4	9.1
9	Reserved opinion	2	4.5
10	Throat cut	3	6.8

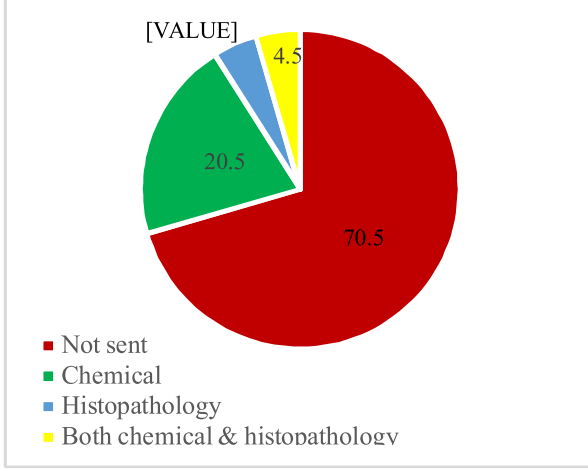
Table 3: Month-wise distribution

Month	Cases	%
January	2	4.5
February	3	6.8
March	1	2.3
April	4	9.1
May	7	15.9
June	8	18.2
July	5	11.4
August	3	6.8
September	5	11.4
October	3	6.8
November	0	0
December	3	6.8

Discussion:

In the present study, decomposed bodies comprised 11.6% of the total autopsy load of the department during the period under consideration. Similar findings were observed in a similar study, that they account for about 10% of the total autopsy load.[9] Victims were predominantly males accounting for 86.4% of the cases. Similar male predominance was observed in a study in Kerala.[10] This could be due to the predominantly patriarchal society of

Figure 2: Cases sent for Chemical/ Histopathology Analysis



our country, where a female's main domain is her home; be it parental or in-laws, and her absence is usually enquired in to; while a male is free to go about wherever he wants. The average Indian male, being the bread-winner of his family is usually forced to leave his home and venture to far off places for better opportunities of earning his livelihood. Sometimes, the family is even unaware of the place of employment of the person and at

times, people work at different places each day as manual laborer.

The age group of 21-50 years contributed 72.7% of the cases. This is the most mobile age group for various reasons, both economic and social and hence also the age group prone to unnatural deaths; suicidal, accidental or homicidal. However, taking the decadal distribution in to consideration, it was found that the group belonging to 41–50 years was the single most involved in these cases. This is in agreement with a similar study conducted by Cyriac Job where he observed one of the common age group to be 41-50 years.[10] Though the socio-economic data of these cases could not be compiled for obvious reasons, usually a majority of these cases were from the lowermost rungs of the socio-economic ladder.

Viscera was sent for analysis in 29.5% cases. Of these 13 cases where viscera were sent for analysis, reports were not received in about 15.4% cases till finalization of this paper. This is a very sizeable percentage of the cases and speaks volumes of the delay taken by the various laboratories in processing the cases.[11]

In the other 70.5% cases, the cause of death was obvious like Drowning (31.8%); head injuries (15.9%), strangulation (13.7%), hanging (9.1%) and multiple organ failure/disease (9.1%). Homicidal manner of death with sharp weapons was cause of death in 3 cases. This could probably be due to murder of victims who lived alone for money or property.

The months in which maximum cases were brought to mortuary in decomposed state were June (18.2%) and May (15.9%) whereas November reported zero cases. This could be due to favorable environmental conditions.

Conclusion:

Decomposed bodies brought for post-mortem examination comprise a small but a very significant and important group of cases in every autopsy surgeon's career. These cases really test the skill and expertise of the specialist and the investigative agencies, to the limit. Most of the decomposed bodies remain unidentified hence require time consuming legal formalities, such as a waiting period of about 72 hours, publication of photographs and details of the deceased in the leading dailies, interactive pooling of data from various agencies all over the country, etc., to name a few.

A forensic medicine specialist can contribute very much by giving detailed data gathered from a thorough examination and dissection of the body. It is also his duty to opine regarding the cause, manner and nature of death, based on his findings, reports of the investigations sought by him from different laboratories, etc. It is here that his skill and expertise come in to play.

Ethical Clearance: Obtained
Conflict of Interest: None
Financial Assistance: None

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