

Profile of exhumations and autopsy on exhumed dead body or human remains: A retrospective study

Dharmaraya Ingale^{1*}, M.A. Bagali², Chandrashekhar Bhuyyar³ and S.R. Hibare³

¹Department of Forensic Medicine & Toxicology, St. Paul's Hospital Millennium Medical College, P.O. Box 1271, Addis Ababa, Ethiopia, North Africa, ²Department of Forensic Medicine & Toxicology, Al Ameen Medical College and Hospital, Athani Raod, Vijayapur-586108, Karnataka, India and ³Department of Forensic Medicine & Toxicology, BLDE University, Sri B.M. Patil Medical College, Solapur Road, Vijayapur-586103, Karnataka, India

Abstract: *Background:* Exhumation is a process by which the already buried dead body is taken out by digging under the law of the land. Most of exhumations are attended by non forensic hence the legal procedure of exhumation and meticulous examination of the dead body are lacking and literature is silent regarding it. *Objective:* To study exhumation process, digging time, depth of burial, posture of the body, human remains cause of death and interval between death and burial were studied. *Materials & Methods:* 18 cases of exhumation carried at Vijayapur district from 2003 to 2015 were studied. *Results:* Average digging time 56 minutes, average depth of burial 3.56 feet, posture of the body in 50% sitting and in 50% horizontal, in all cases except one case skeleton remains were examined, cause of death found in 88.88% cases, average duration of burial 103 days. Interval between death and burial affects rate of decomposition. In 2 cases cause of death not found hence soil and decomposed soft tissues were preserved, duration of skeletization to occur was 2 to 3 months. *Conclusions:* Exhumation is not a futile exercise and cause of death can be found in most of cases irrespective of duration of burial. Interval between the date and time of death to the date & time of burial is also an important factor which affect rate of decomposition. Always it is advantageous to hold exhumation & medico legal autopsy on the exhumed dead body or the remains by Forensic Medicine & Toxicology expert.

Keywords: Exhumation, Adipocere, Time since death.

Introduction

Often it is said that the exhumation is futile exercise in the law, where in cause of death remains undetermined and at the most it may help to confirm that death of missing person or alleged dead person.

Inhumation is the process of burying the dead body while exhumation is a process by which removal of already buried body from the grave [1]. The commonest reason for exhumation globally is medico-legal, i.e., if an individual dies in suspicious circumstances, the police may request exhumation in order to determine the cause of death. However there are so many other religious [2] cultural and social reasons on basis of which exhumation is carried out in different part of the world. Exhumation is done with some definite objectives under the order of appropriate authority [3] for the purpose of: i) Identification, to confirm the individuality for any criminal or

civil purpose arising after the burial ii) To establish the cause of death: when any foul play is suspected, exhumation may be ordered depending upon the public demand or request by the relatives iii) For second autopsy when the first autopsy report is being challenged or is ambiguous [4]. In the western counties it is reported that the criminals steal the dead body already buried for ransom. To what extent exhumation will solve the questions raised is debatable issue [3], at least it will put an end to rumors' as to the suspicion of death of the said missing person [5].

In India, amongst others, the burial practice and postmortem interval are major determining factors for possible outcome at exhumation. Available minimal existing literature does not exactly point out as to the fruitfulness of this process of exhumation. Hence the retrospective study of exhumations conducted to through light upon existing

literature, in Vijayapur District from May 2003 to March 2015 by the authors, are included in the study.

Objective of the study: Often it is understood that the exhumation is the futile, un necessary, cumber sum effort, because of disappearance of evidence due to de composition & artifacts due to process of exhumation itself resulting in negative opinions. Before Independence or after sixty plus years of post independence era the exact literature as to number of exhumations, their results are not available for the reference. Existing information available in the text books of Forensic Medicine & Toxicology is not only inadequate and does not have authentic scientific references. Hence it is necessary to develop scientific reference criteria for the future generation. In the experience of the authors of this article having attended / conducted number of exhumations conducted in & around Vijayapur are studied retrospectively.

Material and Methods

All the exhumations attended by the authors since 2003 to April 2015 in & around Vijayapur District are included in the study. Available literature related to each case are studied in detail including Police formats 146(i) & (ii), exhumation report, and medico legal post mortem examination report, history as per the statements made by grave identifier's. The parameters for the study were tabulated in master chart. Various parameters thus obtained were summed up, percentages are calculated.

Alleged cause of death (As per the complaint):

Homicide	Accident	Natural	Suicide	Sudden death	Total
9 (50 %)	5 (27.77 %)	2 (11.11 %)	1(5.55 %)	1 (5.55%)	18

Posture of the dead body in the grave & alleged manner of death:

Sitting				Horizontal			Oblique	Total
Murder	Accident	Sui	Total	Murder	Accident	Total	Murder	
5	2	2	9	2 (M)+1	2	5	4	18

Age of deceased at the time of death: Youngest 1 ½ yrs Eldest 68 years Average 40.30 years.

0-10 years	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years
2 (11.11 %)	1 (5.55%)	2 (11.11 %)	1 (5.55 %)	7 (38.88 %)	4 (22.22 %)	1 (5.55 5)

Results

Requisition for to attend Exhumation & conduct medico legal autopsy at the scene of occurrence by investigating officers.

Same day	One day before	Two days before	3-6 days before	Total Cases
3 (16.66%)	9 (50%)	2 (11.11%)	4 (22.22%)	18

Exhumation timings:

Morning 6am to 11am	Noon 11am to 1pm	Evening 1pm to 6.30pm	Total
2 (11.11%)	9 (50 %)	7 (38.88%)	18

Time required for Exhumation, from starting of digging to complete removal of the dead body from grave:

Minimum	Average	Maximum
15 minutes	55.27 minutes	195 minutes

Depth of the burial:

Minimum	Average	Maximum
2ft	3.56 ft	6 ft

Month wise distribution of cases:

January	February	March	April	May	June
2	1	2	2	2	2
July	August	September	October	November	December
0	1	1	1	1	3

Sex wise distribution of cases:

Male	Female	Total
15 (83.33 %)	3 (16.66 %)	18

Religion wise distribution of cases

Hindu	Muslim	Total
16 (88.88%)	2 (11.11 %)	18

Post mortem interval between death and burial:

Minimum	4 hours
Average	9.16 Hrs
Maximum	18 Hours

Duration of burial in no of days:

Minimum	5 days
Average	103.61 days
Maximum	850 days

No of cases and cause of death:

Cause of death found	Undetermined	Total
16 (88.88 %)	2 (11.11 %)	18

Distribution of wounds in exhumed bodies:

Head injury alone	Head & Neck Injury	Head & chest Injury	Chest & Abdomen wounds	Total
9 (50 %)	2 (11.11%)	4 (22.22%)	1 (5.55 %)	16 (18)

Preservation of soil sample:

Preserved for CA	Not preserved	Total cases
2 cases for COD	16	18

Duration of burial & state of body:

Duration of burial	Duration between death & Burial	State of the dead body
5 days	11 Hours	Early decomposition
6 days	4 Hours	Early decomposition
12 days	6 Hours	Partially decomposition
20 days	14 Hours	Liquifactive decomposition
22 days	16 hours	Partial decomposition (sandy dry)
35 days	15 Hours	Decomposition & Adipocere (Humid)
38 days	4 Hours	Liquifaction / Skeletinisation (dry) superficial buriel
44 days	5 Hours	Adipocere (Semi Humid Agri)
45 days	8 hours	Adipocere (Humid/wet)
52 days	7 hours	Partial decomposition / Adipocere
53 days	6 hours	Partial decomposition + Adipocere
63 days	4 Hours	Decomposition/ adipocere/ mummification (dry)
63 days	8 Hours	Decomposition, Skeletinization + adipocere
68 days	12 Hours	Decomposition/ adipocere/ mummification
109 days	14 hours	Adipocere (Semidry)
110 days	18 Hours	Skeletinized
270 days	6 Hours	Skeletinised
850 days	7 Hours	Skeleton with liquid soft and smell of decomposition

Discussion

Text books of Forensic Medicine do describe as to exhumation shall be preplanned & date of the exhumation shall be fixed as to the availability of the Doctor. As the Doctor being busy with other work of life saving measures. However in this study in 50% of cases the Doctor was informed by the police / magistrate one day prior to exhumation being done, that means the police or the magistrate decide the date & later call the Doctor. Only in 22.22 % of cases Doctor decided the date 3-6 days prior. In 16.66 % of cases Doctor was called / rather compelled to come to exhumation site on the same day. This aspect is presumed to be prerogative investigating agency rather than Doctor.

In the present study out of 18 cases 9 (50%) were done in the mid day ie 11AM to 1PM, 7 cases were done after 1PM ie evening hours, two cases were done before 11 AM morning. Only in one case exhumation was deferred to next day after incomplete digging due to bad light. In 50% of cases there was h/o alleged homicide & body has been buried, in 5 cases dead body was buried after the death due to accident. Two natural death cases where there was suspicion of cause & manner of death. In the present study average duration of exhumation ie time required for digging out the buried body is around 55.27 minute's, minimum was 15 minute's in one case, while 195 minutes in another case, where in the exhumation was adjourned to next day due to bad light & want of Forensic Medicine expert as requested by the medical officer from the Primary Health Center concerned.

Present study reveals that, often the burial grounds were of loose soil & the average depth of grave was 3.56 ft, shallow grave found in this study was of only two feet, in which the dead body was buried hurriedly in one of the room corner in the house after killing. Maximum depth of the grave was found in one case where in deceased was killed in the neighboring state-border district & the dead body was shifted to native village (300) km in Karnataka Vijayapur district, where in the body buried to the depth of 6 feet, 35 days before day of exhumation, during rainy season & dead body was showing signs of adipocere changes. Among 18 cases 9 (50%) were buried in sitting posture, all belong to Hindu by religion, among which 5 cases were

homicide's, accidental & suicidal were two cases each. In five cases the dead body was buried in Horizontal position three of them were of homicide's, 2 belong to Muslim by religion [6]. Among 5 horizontally buried cases 2 cases were of accidental deaths one among them was child belonging to Hindu by religion. Out of 18 cases in 4 cases the dead body was buried oblique or bizarre manner all the cases were of homicide's.

Among 18 cases studied, 11 (61.11 %) cases were between 41-60 years of age, rest all the cases were spread in all the age range from 1 ½ years to 68 years. Among the 18 cases studied 15 (83.33 %) cases were male & only three cases were female buried dead body. As in India woman is financially not independent or not a independent decision maker in the family or the society. Islam forbids exhumation of buried body for want of burial of another [6]. In this study two Muslim dead bodies were exhumed for h/o Alleged homicide in presence of Magistrate & police. Where in multiple wounds were found over the body / remains supporting the allegation made. Exhumations were held almost round the year but relatively more number of cases were done in the month of December & January in the present study.

The time lapsed after death of the individual, till burial is an important factor which influences rate of decomposition in the grave. Hence presumed state of the dead body as per Casper's dictum may not be found in a given case during exhumation (as the dead body decomposes more rapidly in the air than burial ground). Hence attempt has been made in this study to collect date & time of death of individual and date & time of burial in all the studied. It was found that the minimum time in one case was 4 Hour's & maximum 18 hour's. As far as the law of the land in our country there is no time limit for exhumation of buried body. However in the present study, in a given case exhumation was done within 5 days after burial (Buried in house) while another case 850 days (2 years 3 months 10 days) after burial.

It is the notion of the public, police and medical professionals that, the exhumation

will put an end to rumor if not to detect the cause & manner of death [3]. K S Narayanreddy's Essentials of Forensic Medicine & Toxicology describe- interpretation of findings of a second autopsy performed on previously autopsied exhumed body is difficult, due to various artefacts of exhumation & first autopsy. Even if the result of autopsy on exhumed body is negative it will put an end to rumors of suspicion.

Contrary in this study is that 16(88.88 %) out of 18 exhumations definitive cause of death was found & only in two exhumations (11.11 %) the cause of death was un determined. Among 18 exhumed dead bodies in 16 (88.88 %) cases ante mortem wounds were found in the dead body / remains examined. Head injury was most common finding which was found in 50 % of cases as fatal wounds, head / neck wounds in 2(11.11%), Head & chest wounds in 4 (22.22%) and chest & abdomen wounds in one case. Question of identity among the cases exhumed did not arise in any cases that were exhumed, however, Investigating officer wanted to prove exact identity in one case in which case femur bone was preserved.

Except in two cases, in all other cases alleged history was confirmed by autopsy in the form of mechanical wounds, hence investigating officers only decided not to preserve either viscera or soil because it delays the progress of investigation. Only in two cases wounds & diseases were not found, in the remains recovered & examined, hence viscera were preserved where in chemical analysis report was negative for poison. However in another case (burial period 5 days) Viscera was preserved as there was abnormal smell in stomach where in fatal head injury was found, the chemical analysis report was positive for Alcohol [7]. Soil from above, below and two sides of body or the coffin should be preserved in clean containers separately.

Looking at above table it is very much apparent that for for skeletization to occur in the burial ground, mean post mortem interval is 2 to 3 months, as per casper's dictum in Forensic pathology, more than 8 weeks are required for this change to occur. Rajesh Baradale et al [5] "in the present study we had noted partial skeletization with mean postmortem interval of 45 days". Rajesh Bardale, Vipul Ambade,

Pradeep Dixit. Amongst others, the burial practice and postmortem interval are major determining factors for possible outcome at exhumation.

However Wilton Marion Krogman & Mehmet Yasar Iscan [8] Describe, The bones themselves give an idea of elapsed time by presence or absence of ligamentous attachment and in the rates of leaching out of fats & other organic matter.

Observations:

1. All the dead bodies were exhumed in presence of police (not below the rank of PSI), Executive magistrate or Sub divisional magistrate and Forensic Medicine experts.
2. Digging time required on an average is 56 minutes, minimum 15 minutes & maximum 195 minutes.
3. Depth of burial on average 3.56 feet, minimum 2 feet and maximum 6 feet. In case of homicides often depth is more superficial.
4. The posture of the body in the grave 50% of cases it was found in sitting posture among which 5 cases were alleged homicides all belong to Hindu by religion, rest of cases were alleged death due to accident & suicide two each. Remaining 50% (9)cases in 5 cases the dead body was in Horizontal posture while in 4 cases the dead body was in oblique posture or semi-oblique.
5. After exhumation in all the cases the dead body / human remains were examined at / near the scene of exhumed site, only in one case where, the perforating wound over the skull was found the skull, was recovered for further examination like X-ray.
6. Almost all the cases (88.88 %) irrespective of duration of burial, cause of death was detected in the form of mechanical wounds with ante-mortem blood clots around, by naked eye examination.
7. Shortest duration of the burial among the cases studied was 5 days and longest duration of burial was 850 days, while average duration of the burial was 103 days.

8. Interval between the death & burial, does have much more influence on the rate of decomposition in buried body, along with duration of burial.
9. Sample of soil & decomposed soft tissues were preserved in two cases, where the wounds & natural diseases were not found during post mortem examination.
10. Post mortem interval, for skeletonization to occur, in this study was around 2 to 3 months.
11. Adipocere change was noted in the bodies buried for more than 38 days on an average.

Conclusion

1. Exhumation is not a futile exercise and cause of death can be found in most of cases irrespective of duration of burial.
2. Interval between the date and time of death to the date & time of burial is also an important factor which affect rate of decomposition.
3. It is advantageous to hold exhumation in presence of Forensic Medicine & Toxicology expert only.

References

1. Mukta Rani, Pawan Kumar, Mukesh Kumar, Yashoda Rani. Karger et al. Exhumation and Identification: A Case Report. *J Indian Acad Forensic Med.* 2012; 34(4):361-363.
2. Modi's Medical jurisprudence & Toxicology, 22nd edition (student edition) edited by Dr. B.V. Subramanyam 2002; 107-08,
3. Narayanreddy KS. Essentials of Forensic Medicine & Toxicology, 23rd edition, K Sugunadevi 2004; 108.
4. Lincoln Exhumation. World of Forensic Science. 2005. *Encyclopedia.com.* 30 Apr. 2015 available at, <http://www.encyclopedia.com>.
5. Bardale R, Ambade V, Dixit P. Exhumation: A 10-Year Retrospective Study *J Indian A c. ad Forensic Med.* 2012; 34(2):143.
6. Dinesh Rao's. e-book, autopsy; exhumation available at <http://www.forensicpathologyonline.com/e-book/autopsy/exhumation>
7. Krogman WM & Iscan MY. The human Skeleton in Forensic Medicine, II edition, *Charls C Thomas Publisher*, 1962; 30.
8. Apurba Nandy. Principals of Forensic Medicine Text Book. Second edition reprint 2004; 182.

*All correspondences to: Dr. Dharmaraya Ingale, Professor, Department of Forensic Medicine & Toxicology, St. Paul's Hospital Millennium Medical College, P.O. Box 1271, Addis Ababa, Ethiopia, North Africa. E-mail: dharmarayaingale@yahoo.com