

Profile Study of Negative Autopsy among the Post Mortem Cases Referred from Medical Officers to Forensic Medicine Department, Ahmedabad, India

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ABSTRACT

Background: The principal aim of an autopsy is to determine the cause of death, and the state of health of the person before he or she died. But in several instances even after detailed autopsy and various laboratory investigations, autopsy surgeon/ Forensic medicine expert cannot determine the cause of death and they end up with negative autopsy. The present study was carried out to find out the types of cases where we were unable to determine cause of death after autopsy at forensic medicine department, B J medical college, civil hospital, Ahmedabad, India.

Methods: A total of 251 dead bodies were referred by Medical officers to forensic medicine department, B J medical college, Ahmedabad for expert post mortem examination from 1st January 2011 to 31st December 2015.

Results: After thorough and complete post mortem examination, it was found that in 43(17.13%) cases no opinion as to the cause or nature of death could be given. Most common types of cases include decomposition (53.50%), and skeletal remains (23.25%).

Conclusion: According to above mentioned facts it is clear that chances of getting cause of death is very poor if time lapse more and more after death like in decomposition and skeletal remains.

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► *Implication for health policy/practice/research/medical education:* Negative Autopsy among the Post Mortem Cases

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1. Introduction:

The principal aim of an autopsy is to determine the cause of death, and the state of health of the person before he or she died (1). The Medico-legal or Forensic Autopsy, which is performed on the requisition of the law enforcement agencies in circumstances

relating to suspicious, sudden, obscure, unnatural, litigious or criminal deaths, and the information so derived is applied for legal purposes to assist the course of justice (2). Several surveys in various countries have shown that in cases where a doctor offers a cause of death without the benefit of autopsy findings, the error rate is of the order of 25–50%, even in hospital deaths. Thus, the importance of autopsy in improving the value of death certification is undoubted. But, it still has to be conceded

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that the autopsy is by no means infallible in revealing the definite cause of death. These may be called as cases of 'Obscure Autopsy'. In many of these cases, cause of death can be made out after detailed laboratory examination of different materials/samples from the body. However, at rare occasions, the cause of death may still remain unknown even after detailed laboratory investigations. Such cases may be termed as cases of negative autopsy. There may be no adverse medical history, the gross examination may reveal nothing abnormal and histological, toxicological, microbiological and virological screening remains unrewarding. In such a situation, as professor Alan Usher of Sheffield points out, the case needs to be labeled as 'unascertainable' (2). This 'obscure autopsies' are more common in the younger age group. At times, the death may be due to interaction of multiple factors, as in case of anesthetic deaths, when it may become difficult to apportion the correct liability to each. The common obscure causes of death may include the following (1).

Natural Death

Pathological process causing death is not conspicuously evident. The morbid changes cannot be detected by histopathological and other investigations due to lack of such facilities at the place of autopsy. Death having been precipitated by emotional stress and strain, sudden flight of temper and anger, sudden shock, work stress, etc., acting on a previously diseased heart or any other organ, the existence of which might even have been unknown to the victim himself/herself. Death occurring from functional failures, e.g. epilepsy, strokes, and etc. (2).

Biochemical Disturbances

It includes uraemia, hyperglycaemia, hypokalaemia (potassium deficiency), hypocalcaemia, electrolyte imbalance as in potassium deficiency, etc. Respiratory disorders as may be seen in severe anaemia, porphyria, etc. (3).

Endocrine Dysfunction

Adrenal insufficiency and thyrotoxicosis or myxoedema (4).

Concealed Trauma

Concussion, blunt injury to the heart, blast effect without any external injury and electrocution without any external mark (5).

Poisoning

Delayed sub toxic or narcotic poisoning, anesthetic over dosage or maladministration, neurotoxic or cytotoxic poisons and plant poisoning, etc. (6).

Miscellaneous

Reflex vagal inhibition, incompatible blood transfusion, air embolism, allergic reactions including drug idiosyncrasy (anaphylactic deaths), etc (3). Moreover, the coronary artery disease⁴, Myocardial infarction (5), congestive cardiac failure (6), heart failure due to pheochromocytoma (7), mesenteric vein thrombosis (8), epilepsy (9), sports related activities (10), congenital anomaly like situs inversus (11), spontaneous subdural (12) and aneurismal subarachnoid hemorrhage (13) may also contribute to sudden/unexpected deaths in apparently healthy individuals without showing any specific finding at autopsy. The purpose of the present study was to find out the group of cases in which chances are more of negative autopsies in the last five years.

2. Materials and Methods:

The data of this study were obtained from postmortem records of 5 years with effect from 1st January 2011 to 31st December 2015 of the Department of Forensic Medicine and Toxicology, B J Medical College, Ahmedabad. The study included expert opinion cases referred to us by Medical officers like custodial deaths, operative death, cases referred from PHC, CHC and cases in which forensic medicine expert was particularly called. In all cases gross examinations was mainstay of observation for any obvious cause of death. Histopathological examination, Microbiological and toxicological analysis were done on specimen obtained during autopsy for determination of cause of death. All the qualitative variables like, age, sex, opinion regarding cause of death, negative autopsy rate were recorded and the data was then entered in computer programme called Microsoft Excel to analyze for descriptive

statistics. The percentages of these variables were calculated.

We declare that we have maintained privacy and confidentiality of the participant whose information is used in this article.

3. Results:

Out of 251 referred cases, no opinion about cause of death was given in 43 cases. Table 1 shows that highest percentage of negative autopsy is in 2013 and average percentage of autopsy is 17.13%. Table 2 shows that the percentage of negative autopsy in male (58.13%) is higher than female (41.87%). Age wise distribution of negative autopsies cases is given in Table 3.

Table 4 shows that out of total no. of negative autopsy cases highest cases were of decomposition and next was skeleton remains. There were some fresh(not showing late post mortem changes like decomposition) cases also like 2 cases of burns, 4 cases of post-operative death, 1 case of drowning, 1 case of electrocution, 1 case of custodial death and 1 case of newborn death, total 10 cases.

4. Discussion:

In the standard text book it is stated that 2-5% are negative of all autopsies (14). The rate may also vary according to the competency, personality and seniority of the doctor conducting the autopsy. The term ‘Negative autopsy’ is used in a wrong sense by several books which tend to include so called ‘Defective autopsy’, within this term whenever a well-established post mortem procedure, techniques or ancillary investigation is not done, be it due to ignorance, lack of training or due to non-availability of resources etc., it is a ‘Defective autopsy’ (22). The question of experience or non-experience of doctor, availability of resources should not be included in the definition of negative autopsy because of two reasons: (1) Legal reasons: Such excuses are not valid defences in a court of law to justify a diagnosis of ‘negative autopsy’, e.g. In a case of anaphylactic death due to xylocaine injection a autopsy surgeon should investigate serum trypase test to diagnose anaphylactic shock,

Table 1: Distribution of percentage of yearly negative autopsy (n=43)

YEAR	Total No. of Referred Autopsy	Total No. of Negative Autopsy	%
2011	48	8	16.66
2012	32	3	09.37
2013	51	13	25.49
2014	55	11	20.00
2015	65	8	12.30
TOTAL	251	43	17.13

Table 2: Distribution of sex in negative autopsy (n=43)

Year	Total No. of Negative Autopsy	Male (%)	Female (%)
2011	8	2 (25)	6 (75)
2012	3	2 (66.66)	1 (33.33)
2013	13	8 (61.53)	5 (38.47)
2014	11	6 (54.54)	5 (45.45)
2015	8	7 (87.5)	1 (12.5)
TOTAL	43	25 (58.13)	18 (41.87)

Table 3: The age wise distribution of negative autopsies (n=43)

Age Ranges (Years)	No. of Cases	Percentage (%)
0-9	7	16.27
10-19	3	6.98
20-29	15	34.89
30-39	12	27.90
40-49	5	11.63
50-59	1	2.33
TOTAL	43	100



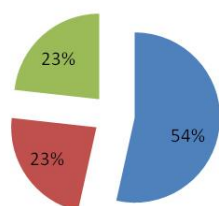
Figure 1. It shows total number of negative autopsy.

but he failed to conduct it and given no opinion about cause of death. Thus in this case judge told that it is defective autopsy

Table 4: Profile of cases of negative autopsy

Year	Total No. of Negative Autopsy	Decomposition	Skeleton Remains	Fresh Cases
2011	8	4	3	1
2012	3	0	0	3
2013	13	10	1	2
2014	11	6	3	2
2015	8	3	3	2
TOTAL	43	23	10	10

■ DECOMPOSITION ■ SKELETON REMAINS ■ FRESH CASES

**Figure 2.** It shows negative autopsy cases.

not negative autopsy and warned autopsy surgeon (2). Medical reasons: What would be a normal autopsy for one, would become a negative autopsy for other. Such definitions which change with the person defining them are not scientific definitions. Causes of defective autopsy: (1) Inadequate crime scene examination, (2) Inadequate examination of cloths, (3) Inadequate history, (4) Inadequate external examination, (5) Inadequate internal examination, (6) Inadequate laboratory examination, (7) Inadequate toxicological examination, (8) Inadequate autopsy surgeons training. The negative autopsy rate (17.13%) in this study shows that this is very high rate as compared to various studies reported by some international and national studies. Negative autopsy rate (23.44%) documented by Chughtai BR *et al* (15), in Pakistan, (6.93%) by Rehman M *et al* (16), and (5.4%) by Biswas (17) in Bangladesh, (20.3%) in Turkey reported by Ince H *et al* (18), and (14.4%) in Tokyo Japan by Sakai *et al* (19), is still higher than stated in the standard text books. Whereas; (1.45%) negative autopsy rate was found by Khan MY *et al* (20) in Peshawar. In another study by Toufique K *et al* from Bangladesh, it has been reported that in the last ten year period total negative autopsies estimated to be 141 this

represented 6% of all cases (21). The incidence of male predisposing is 58.13% in our study. That may be likely to the fact that females in this part of the of country due to religious, cultural and traditional customs, are to be spared due to their household abodes, and because they hold honored place even in disputes and enmities. They are least victims of deaths than males in our society. Also this may be due to fact that males were more exposed to external environment than females. All most all age group were represented in which negative autopsy was found, with the majority being in the young adults aged persons (20-29 years, 34.89%). In teenagers and young adults, up to the age of about 35 years, there is a higher proportion of negative autopsies than in the older group, which provides the vast majority of the autopsy workload. The young adult does not have the almost universal overlay of degenerative cardiovascular disease that is seen in the older group. Thus it is probable that the same occult disease process occur in that older group as in the young, but as the latter don't have other lesions that can be grasped (usually quite legitimately), as a valid cause of death, then nothing presents itself to the pathologist. Negative autopsy is not a sign of failure of autopsy surgeon; a negative autopsy may help to explore the possibility of natural death, even though there might have been an initial suspicion of foul play as to the cause of death. Ancillary investigations may not provide any help, but they must be carried out in order to exclude such causes and to prevent allegations that the death was not investigated as fully as it should have been. It can be added, however, that the absence of injuries, poisoning, lethal infection or well-recognized natural disease

is in itself significant evidence negating such causes. The use of terms like 'heart failure' or 'cardio respiratory arrest' is pointless and merely confuses the issue. A 'mode of death' is useless in lieu of a 'cause of death'. There is no point in producing a speculative cause of death if that cannot be substantiated in later court evidence or legal statements. The more the autopsy surgeon knows about the total scenario, the more he/she can contribute from the autopsy. Conversely, the less the autopsy surgeon knows about the history and circumstances surrounding death, the greater is the likelihood of overlooking useful findings. Decomposed bodies, though esthetically unpleasant, but are still human bodies that deserve thorough examination. There is an understandable tendency to dispense with examination of decomposed tissues as un-necessary or unproductive activity, especially at the peripheral hospitals/dispensaries. At occasions, it may be challenging, especially when the state of the decomposition is advanced. However, making an attempt may prove worthwhile as cases have been reported where the brain tissue decomposed to the consistency of soft paste has yielded useful information in toxicological screening. Skeletal muscle is another useful tissue in such circumstances, as this will provide drug and/or alcohol level that will generally approximate to that of blood levels. Specimen of vitreous fluid may also be collected for screening drug(s) or electrolytes. It is therefore advisable that Medical Officers working in the peripheral hospitals/dispensaries should endeavour to conduct such cases at their own level (may be under the supervision/guidance of seniors/more experienced colleagues), since the referral involves further time allowance for progression of decomposition, rendering findings surprisingly hopeless till the time is squeezed by the expert at the institute to conduct examination out of his/her busy schedule.

5. Conclusion:

According to above mentioned facts it is clear that chances of getting cause of death is very poor if time lapse more and more after

death like in decomposition and skeletal remains. In this study negative autopsy rate is quite higher than the rate given in standard textbook because post mortem examinations included in this study are referred from the medical officers of various districts for forensic medicine expert advice and guidance, and most of time these dead bodies were in late post mortem changes of death phase. Most of time a Government Medical College where forensic experts are available catering 5-6 districts. PHCs and civil hospitals are located throughout the all district but for expert opinion or for custodial death bodies are transported to Government Medical College for post mortem examination. The major disadvantages are the costs to transport bodies, loss of evidences in handling, wasting of man power like police staff, lots of inconvenience to relatives and most important are more and more time lapse after death, but if there is a forensic expert available at each district level, we can get rid of these problem. Forensic telemedicine might be a good initiative because many times due to lack of experience and proper medico legal knowledge, medical officers at the Primary Health Center miss the important evidence or findings during autopsy. Even some times they hesitate in doing some postmortem, like murder, decomposed body etc. In such situation we can build some short of system like medical officer will call us or send photograph through internet during autopsy and take proper guidance for the same. Video conferencing is also a good option for the same. But best alternative to this is District Forensic medicine Expert. Medical examiner's system is also helpful in reducing negative autopsy rate. We have to develop efficient cold room facility at primary health care level to preserve bodies and thus evidences. There is need of training for police staff about how to take care of minor details while dealing with suspicious cases. Visiting the scene of death by autopsy surgeon before doing the autopsy will decrease the chances of uncertainable autopsies. It may be said that the methods of crime are changing rapidly, so it is

imperative that investigative facilities should be more sophisticated and easily available with the advances in modern technologies like special stains to diagnose specific pathological conditions, immunohistochemistry, recent imaging techniques etc. may provide helpful information to investigate and certify the cause of death in medico legal practice and reducing the figure of negative autopsies.

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