

Mean time spent on gross exam of complete forensic autopsy at Chulalongkorn Forensic Medicine Center

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Research background : *The study of time spent in performing a complete forensic autopsy is essential for the evaluation of the standard of forensic investigations as well as the cost estimation of an autopsy. Currently, there has not been any study on this topic in Thailand. This is the first study which is aimed to provide data for the development of the standard of autopsy and its cost calculation.*

Objective : *To study the time spent in performing a complete forensic autopsy.*

Material and Method : *Duration of time spent on complete performance of autopsy cases of 4 forensic doctors in March 2006 (2549 BE) were recorded.*

Result : *The duration of time spent in complete performance of an autopsy was between 30 – 140 minutes, depending on the cause of death. The mean of time spent was 61.25 min. Forensic doctors who followed the same standard of autopsy protocol spent almost the same time in their operation on the same category of cadaver.*

Conclusion : *The duration of time spent to complete an autopsy case varies depending on the cause of death and the degree of complication involved in the investigation of the cadaver. Autopsy cases can be divided into 3 categories which can be used for the evaluation of the standard and cost estimation of an autopsy.*

Keywords : *Time spent in autopsy, Complete autopsy, Forensic autopsy.*

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- ปัญหาของการทำวิจัย** : การศึกษาระยะเวลาในการผ่าตัดนิติเวชเต็มรูปแบบ เป็นส่วนหนึ่งที่สำคัญในการประเมินมาตรฐานการชันสูตรพลิกศพ และในการคิดคำนวณ ต้นทุนของการตรวจชันสูตรพลิกศพ ในปัจจุบันยังไม่มีการศึกษาเรื่องนี้ในประเทศไทย การศึกษานี้เป็นการศึกษาครั้งแรกเพื่อเป็นข้อมูลในการพัฒนามาตรฐานการผ่าตัด และนำไปใช้ประโยชน์ในการคำนวณต้นทุน
- วัตถุประสงค์** : ศึกษาระยะเวลาที่ใช้ในการผ่าตัดเต็มรูปแบบ
- รูปแบบการวิจัย** : การศึกษาไปข้างหน้าแบบพรรณนา
- วิธีการศึกษา** : บันทึกเวลาที่ใช้ในการตรวจศพเต็มรูปแบบ ของแพทย์นิติเวช 4 ท่านในเดือนมีนาคม พ.ศ.2549
- ผลการวิจัย** : ระยะเวลาที่ใช้ในการผ่าตัดเต็มรูปแบบอยู่ระหว่าง 30 – 140 นาที ขึ้นอยู่กับสาเหตุการตายที่แตกต่างกัน เวลาเฉลี่ยในการผ่าตัดคือ 61.25 นาที ผู้ชันสูตรพลิกศพที่ปฏิบัติตามแนวทางมาตรฐานเดียวกัน จะใช้เวลาในการผ่าตัดประเภทเดียวกันใกล้เคียงกัน
- สรุป** : ระยะเวลาที่ใช้ในการผ่าตัดเต็มรูปแบบมีระยะเวลาที่แตกต่างกันในช่วงกว้าง โดยขึ้นกับสาเหตุการตาย และความยากในการตรวจศพ แต่ละศพ โดยแบ่งเป็น 3 ประเภท ซึ่งเป็นเกณฑ์หนึ่งที่น่าไปใช้เป็นแนวทางตรวจสอบมาตรฐานการผ่าตัด และนำไปคำนวณต้นทุนการผ่าตัดต่อไป
- คำสำคัญ** : เวลาเฉลี่ยในการผ่าตัด, การผ่าตัดนิติเวช, การผ่าตัดเต็มรูปแบบ

The length of time spent to complete a forensic autopsy is conditioned by type of cadaver, and the forensic doctor who performs the autopsy. This study is conducted to find out the conditions that determine the length of time spent to complete an autopsy case as the duration of time spent in autopsy is an index of quality of the autopsy.⁽¹⁾ Since an autopsy which is performed too fast may cause miss several details which lead to a wrong conclusion of the investigation as well as the manner of death of the person.

In addition, the time spent in autopsy performance is essential for the calculation of the cost of the autopsy,⁽²⁾ especially the costs of the electricity and water used in the operation. Both expenditures directly vary according to the duration of time spent in the performance. Also, it is used in the risk estimation of forensic doctors and their assistant staff when they are exposed to the cadaver and its affiliated agents.

Method of study

This is a prospective and descriptive study on the time spent to complete an autopsy case, conducted by a team of forensic doctors of the Department of Forensic Medicine, Faculty of Medicine, Chulalongkorn University. The team consists of 4 forensic doctors who have experiences in this field from 6 to 19 years and 3 assistant staff with 12 – 30 year- experience. The operations investigated the head, brain, organs of the neck, chest and abdomen of cadavers from 1st to 31st March 2006(2549 BE). All autopsy results have peer review every Tuesday. The length of time spent was started from external exam and ended when forensic doctor performs complete autopsy as the protocol standard, not including the

time that an assistant staff sutured the cadaver. Four staff in this study from 8 staff of Chulalongkorn Forensic Medicine Center perform autopsy following the protocol (annex) which is based on the autopsy guidelines of England, EU and US standard.

Result

There were 36 cases of complete autopsy from 88 cases in March 2006. One was performed as a demonstration case; two were performed for examination cases of forensic residents. The duration of time spent to complete an autopsy varies according to the cause of death of the cadaver as illustrated in Table 1.

Discussion

The time spent to complete a case of autopsy varies between 30 – 140 minutes with the mean of 61.25 minutes. The mean of time spent in examination of a resident is 135 minutes, and 80 minutes for demonstration to residents in training. Other autopsy cases which were neither for examination nor teaching demonstration averagely acquired 56.21 minutes to complete.

Cases of the same cause of death, especially those with myocardial infarction as the cause of death or accident with head injury, the durations of time spent to complete the autopsy are almost similar even when they are performed by different forensic doctors, given that they followed the same standard of autopsy protocol.

In cadavers with clear history and their pathology were limited in an organ system, e.g., death from myocardial infarction, the time spent to complete the autopsy was shorter than those with other

Table 1. Time spent for complete autopsy in various causes of death.

Cause of death	Manner of death	Time spent (min)
Epidural hemorrhage	Homicide	130(examination)
Subdural hemorrhage	Traffic accident	140(examination)
Circulatory failure	Undetermined	60
Peritonitis	Natural	55
Drowning	Accident	60
Brain contusion	Traffic accident	80
Tuberculosis	Natural	30
Brain laceration, fall	Accident	40
Brain death, cut throat	Suicide	40
Subdural hemorrhage	Traffic accident	60
Circulatory failure	Natural	80
Brain laceration, gunshot	Homicide	45
Asphyxia, hanging	Suicide	110
Brain contusion	Traffic accident	30
Brain contusion	Undetermined	50
Subdural hemorrhage	Traffic accident	80(demonstration)
Pneumonia	Natural	30
Subdural hemorrhage, fall	Accident	50
Drowning	Accident	35
Heart laceration	Traffic accident	60
Myocardial infarction	Natural	30
Myocardial infarction	Natural	40
Myocardial infarction	Natural	35
Brain laceration	Traffic accident	110
Hemopericardium	Traffic accident	50
Myocardial infarction	Natural	60
Carcinoma	Natural	75
Heart laceration	Traffic accident	80
Pancreatitis	Natural	90
Myocardial infarction	Natural	35
Subdural hemorrhage	Traffic accident	60
Drug abused	Undetermined	50
Myocardial infarction	Natural	55
Peritonitis	Traffic accident	60
Cardiomyopathy	Natural	40
Heart laceration, stab wound	Homicide	70

cause of death, averagely 36.87 minutes. In more complicated cases, for example, cadavers without clear history or without any identified pathology or with multiple pathology scattered in different organ systems or cadavers that need advanced technique of investigation, e.g., radio diagnostic test to locate the position of a bullet, the duration of time spent in these cases was averagely 89 minutes.

From the collected data, the duration of time spent in performing a complete autopsy case should be divided according to the pathology of the cadavers into 3 categories, namely;

1. Simple cases, i.e., having clear history and 1 – 2 pathological condition leading to death, requiring 30 – 40 minutes to complete autopsy.
2. General cases, i.e., having certain degree of complication, requiring 41 – 60 minutes to complete autopsy.
3. Complicated cases require more than 60 minutes to complete autopsy.

Conclusion

This study illustrates the duration of time spent in autopsy varies between 30 – 140 minutes depending on the objectives of the investigation, e.g., conducted for medical teaching and the degree of complexity of the pathology found, in order to reach the standard of investigation, provided that the team of forensic doctors is abide by the same protocol of autopsy procedures. The findings of the study can lead to cost calculation of an autopsy which is necessary for the evaluation of the standard of the forensic investigation.

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Annex

Abridged protocol for complete forensic autopsy

1. External examination of the cadaver for identity and record all the wounds.
2. Take a photograph of all positive findings and important negative findings both external and internal examinations.
3. X-rays in victims of gunshot wounds, burn, SIDS, and decomposition.
4. Collect blood and proper specimens for toxicological and serological investigations.
5. Complete internal examination of all three body cavities including neck organs, with dissection of all the body organs.
6. Incision of the scalp coronally and the flaps reflected forwards and backwards. The skull-cap is carefully sawn through and removed, leaving the dura intact. The brain is cut and removed by gentle traction.
7. Linear incision is made from submental to pubis.
8. The skin on the front of neck, chest, and abdomen is reflected laterally and the anterior abdominal wall is opened, taking care not to damage the intestines.
9. Check the presence of hemopneumothorax when suspected.
10. The ribs are sawn through in a line from the lateral costal margin to the inner clavicle and the front of the chest is removed.
11. Then the trachea is carefully examined for foreign body or signs of occlusion.
12. The tongue and pharynx are mobilized by passing a knife around the floor of mouth close to the mandible. These are then removed downward as the neck structures are dissected off the cervical spine.
13. Remove internal organs as en-bloc.
14. The organs are dissected in a good light with adequate water to maintain an essentially blood-free area.
15. Tissue samples should be retained in formalin for microscopic examination.