Discrepancies between clinical and autopsy diagnosis in traumatic death cases in Siriraj Hospital

การศึกษาความคลาดเคลื่อนของการวินิจฉัยระหว่างการรักษาและการผ่าศพตรวจในกลุ่มผู้เสียชีวิตจากการบาดเจ็บในโรงพยาบาลศิริราช

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Abstract

Background: Hospital autopsy has been questioned regarding its utility, effectiveness, and validity. Previous studies in hospital autopsy has shown some discrepancies between clinical and autopsy diagnosis. The authors conducted this study to reveal any discrepancy existed in forensic autopsy.

Methods: Medical records and autopsy reports of the deceased at Siriraj hospital during 2012-2014 were reviewed. The discrepancies between clinical and autopsy diagnosis were classified into 6 classes according to Goldman et al., and Battle et al., including major discrepancies (class I-II), minor discrepancies (class III-IV), non-discrepancy (class V), and non-classifiable (class VI).

Results: 84 patients were included in this study. Major discrepancies were found with 6 cases in class I (7.1%), and 8 cases in class II (9.5%), while minor discrepancies were found in class III = 18 cases (21.4%), class IV = 11 cases (13.1%). Class I discrepancies were found in cases died from chest injury (3 cases), natural disease after trauma (2 cases), and abdominal injury (1 case).

Conclusion: The discrepancies between clinical and autopsy diagnosis in this study demonstrate the significance of the autopsy as an important investigation tool in traumatic cases. Besides its medico-legal benefit, forensic autopsy could also be used as quality improvement tool.

Keywords: Forensic pathology, Autopsy, Discrepancy, Trauma

บทคัดย่อ

วัตถุประสงค์: การผ่าศพตรวจในทางการแพทย์เป็นประเด็นที่มีข้อถกเถียงกันถึงประโยชน์ ประสิทธิภาพ และ ความสมเหตุสมผล และมักจะได้รับการศึกษาวิจัยเพื่อประเมินคุณค่า แต่การผ่าศพตรวจทางนิติเวชศาสตร์มักไม่ ค่อยได้มีการศึกษาถึงประโยชน์ในแง่การพัฒนาคุณภาพ ผู้วิจัยการศึกษาชิ้นนี้จึงต้องการศึกษาเพื่อประเมินการผ่า ศพในทางนิติเวชศาสตร์

วัสดุและวิธีการศึกษา: เก็บข้อมูลจากประวัติการรักษาและรายงานผ่าศพตรวจชันสูตรของผู้ป่วยที่เสียชีวิตที่ โรงพยาบาลศิริราชในช่วงปี 2555-2557 ความคลาดเคลื่อนในการวินิจฉัยที่พบจากการรักษาและการผ่าศพจะถูก จัดเป็นระดับทั้งหมด 6 ระดับ ได้แก่ ความคลาดเคลื่อนระดับรุนแรง (ระดับ 1-2) ความคลาดเคลื่อนระดับรอง (ระดับ 3-4) ไม่พบความคลาดเคลื่อน (ระดับ 5) และกลุ่มที่ไม่สามารถหาความคลาดเคลื่อนได้ (ระดับ 6)

ผลการศึกษา: ในการศึกษาครั้งนี้มีตัวอย่างทั้งหมด 84 ราย ความคลาดเคลื่อนระดับรุนแรงพบในระดับที่ 1 ทั้งหมด 6 ราย (7.1%) และระดับที่ 2 พบ 8 ราย (9.5%) ส่วนความคลาดเคลื่อนระดับรองในระดับที่ 3 พบ 18 ราย (21.4%) และระดับที่ 4 พบ 11 ราย (13.1%) ซึ่งในกลุ่มความคลาดเคลื่อนระดับที่ 1 พบได้ในภาวะอาการ บาดเจ็บในช่องอก (3 ราย) โรคธรรมชาติหลังจากได้รับบาดเจ็บ (2 ราย) และการบาดเจ็บในช่องท้อง (1 ราย)

สรุป: ในการวิจัยชิ้นนี้พบว่าความคลาดเคลื่อนในการวินิจฉัยระหว่างการรักษาและการผ่าศพตรวจยังเป็นเหตุผล สำคัญที่ควรจะมีการผ่าศพตรวจในผู้ป่วยที่เสียชีวิตจากการบาดเจ็บ และควรนำข้อมูลที่ได้จากการชันสูตรพลิกศพ มาเป็นเครื่องมือในการพัฒนาคุณภาพ

คำสำคัญ: นิติพยาธิวิทยา, การผ่าศพ, ความแตกต่าง, การบาดเจ็บ

Introduction

Autopsy has been a gold standard investigation for diagnosis in postmortem cases for a long time. Information from the autopsy could be utilized in many ways. It is an important part of medical education, research, and quality improvement as it could provide the most accurate means of determining the cause of death and other significant or incidental diagnoses.[1]

Autopsy is also the key to detect missed diagnoses in traumatic death cases, supported by a number of literatures.[2-9] However, some studies revealed insignificant value of autopsy since they might offer little additional useful information.[10-11]

In Thailand, the autopsy rate in every hospital has declined for several years, still, there were no recorded data regarding autopsy discrepancy in Thailand, especially forensic autopsy. Thus, we conducted this study to determine the magnitude of discrepancy between clinical

diagnoses and autopsy diagnoses retrospectively in traumatic death cases in a tertiary care hospital.

Materials and Methods

Cases selection procedure

Autopsy cases record from year 2012-2014 were reviewed retrospectively. The cases with history of trauma such as traffic accident, physical assault, fall, and expired in the hospital, whether in an emergency department, or in a ward, were included in this study. Any deceased who died before hospital arrival, did not received any clinical management, or age under 1 years were excluded from this study.

Process of analysis

The medical records and autopsy reports were reviewed. The general information was recorded, including sex, age, length of arrival time from scene to hospital, length of stay in hospital, cause of injury, chief complaint, underlying disease, vital signs, Glasgow Coma Score, physical examination, investigations, clinical diagnoses, autopsy diagnoses, cause of death.

The clinical diagnoses were compared with autopsy diagnoses. If any discrepancy was found between the clinical and autopsy diagnoses, it would be classified into class I to VI according to the method of Goldman et al[12], and modified by Battle et al[13], with class VI as non-classifiable cases.[14] Class I and II were identified as major discrepancies, while class III and IV were minor discrepancies. Class V was non-discrepancy. If a discrepancy was found in any cases which were identified as immediate death[15], it would be classified into class VI. If there were multiple discrepancies, the most severe discrepancy would be chosen. The detailed descriptions of each discrepancy class are shown in Table 1. [12-14]

The injury with positive discrepancy were also sorted into six body regions according to the Injury severity score (ISS) system.[16] If the autopsy diagnosis revealed any condition not resulted from trauma, it would be sorted into natural disease or unspecified.

Statistical analysis

Pearson's chi-square test was used to determine statistical significance of the association between the discrepancy classes found and selected variables, including length of stay in hospital, site of injuries, and cause of death. P-value less than 0.05 is considered to be statistical significance.

Description of discrepancy	
Major discrepancies	
Class I	Discrepancies in major diagnoses. Knowledge of diagnosis before death would have led to changes in management that could have prolonged survival or cured the patient (eg, pulmonary infarction treated as pneumonia, fungal pneumonia treated as bacterial infection).
Class II	Discrepancies in major diagnoses whose detection before death would not have changed survival even with correct treatment (eg, biventricular cardiac insufficiency due to severe aortic stenosis with missed pulmonary emboli, correctly treated bacterial sepsis with multiorgan failure because of unrecognised postoperative cervical osteomyelitis in a patient with rheumatoid arthritis).
Minor discrepancies	
Class III	Discrepancies in minor diagnoses not directly related to cause of death, but with symptoms that should have been treated or would have eventually affected prognosis (eg, pulmonary carcinoma in a patient with ruptured infrarenal aortic aneurysm).
Class IV	Discrepancies in minor occult diagnoses (non-diagnosable) but with possible epidemiological or genetic importance (eg, symptomless gallstones, goitre).
Non discrepancy	
Class V	Non-discrepant diagnoses.
Non-classifiable cases	
Class VI	Patient died immediately after admission with no diagnostic procedures, or refused any diagnostic procedures or treatment. Necropsy was unsatisfactory with no clear findings and no diagnosis could be established after review of clinical and necropsy data.

Table 1. Description of discrepancy classes by Goldman et al[12] and modified by Battle et al[13]. Class VI is defined as non-classifiable cases.[14]

Results

84 forensic autopsy cases in Siriraj Hospital were included in this study. The majority of cases were male (70 cases, 83.3%). The age of the deceased ranged from 7 years to 84 years in 82 cases (mean age = 42 year-old) and not available in 2 cases. The survival periods in this studied varied from 41 minutes to 174 days (median = 13 hours 27 minutes). The shortest length of stay in the hospital was 14 minutes.

The patients' chief complaints were also recorded at trauma center and emergency department. The most common recorded chief complaint in this study was alteration of consciousness in 35 cases (41.7%).

The causes of injuries could be categorized into 7 groups, the most common cause was traffic accident in 51 cases (60.7%), and the second one was fall (15 cases, 17.9%). Another causes of injury were blunt and sharp force injury, (6 cases, 7.2%), firearm injury (5 cases, 6.0%), physical agent injury (3 cases, 3.6%), and others (4 cases, 4.8%). These are shown in Table 2.

The cause of death in this study could be divided into 7 groups. Head injury was the most common cause of death in this study (40 cases, 47.6%), the second cause was natural diseases as the results of complication in 14 cases (16.7%). These are shown in Table 3.

The discrepancies found from this study were categorized as major discrepancy in 14 cases with 6 cases in class I (7.1%), and 8 cases in class II (9.5%). The detailed description of these cases are shown in Table 4. The minor discrepancy were found in 29 cases; with class III 18 cases (21.4%), and class IV 11 cases (13.1%)

There was no significant association between the type of missed diagnosis, cause of death, and the length of stay in hospital with the discrepancy. Nevertheless, the result still implied some information in this study, as discussed below.

In 50 cases with discrepancy found, chest injury was the most common missed diagnosis in major discrepancy group (3 cases in class I, 3 cases in class II). As for the minor discrepancy group, the most frequent diagnoses which discrepancy existed was natural disease (class III 9 cases, class IV 8 cases). The autopsy diagnoses in each class of discrepancy are shown in Table 5.

Cause of injury	Cases
Traffic accident	51 (60.7%)
Fall	15 (17.9%)
Body assault by blunt/sharp force trauma	6 (7.2%)
Firearm injury	5 (6.0%)
Physical agent injury	3 (3.6%)
Other (unknown, sudden collapse)	4 (4.8%)
Total	84 (100%)

Table 2. The causes of injury in 84 autopsy cases

Cause of death	Frequency
Head injury	40 (47.6%)
Natural disease (complication of trauma)	14 (16.7%)
Chest injury	10 (11.9%)
Multiple injury	9 (10.7%)
Abdominal injury	4 (4.8%)
Extremity & pelvic injury	3 (3.6%)
Others (unknown, electrocution)	4 (4.8%)
Total	84 (100%)

Table 3. Cause of death after forensic autopsy was performed

Sex	Age	Cause of injury	Length of stay	Clinical diagnosis	Additional diagnosis from autopsy	Cause of death
Class I						
M	16	Traffic accident	1 day 4 hours	Severe head injury with fracture pelvis	Liver laceration	Multiple injuries
M	N/A	Traffic accident	20 days	Severe head injury with sepsis	Brain abscess	Complication of injury
M	20	Traffic accident	2 hours	Blunt abdominal injury	Heart contusion with lung laceration	Multiple injuries
F	61	Traffic accident	4 days	Traumatic brain injury	Hemothorax due to multiple ribs fracture	Multiples injuries
F	43	Traffic accident	2 hours	Cardiac injury	Hemothorax due to multiple ribs fracture	Blunt chest injury
M	25	Traffic accident	4 days	Severe head injury	Pneumonia	Complication of injury

Table 4. Detailed data regarding cases in major discrepancy groups

Sex	Age	Cause of injury	Length of stay	Clinical diagnosis	Additional diagnosis from autopsy	Cause of death
Class II						
M	57	Traffic accident	25 days	Severe head injury with meningitis	Brain abscess	Severe head injury
M	35	Traffic accident	4 hours	Multiple organ injuries with organs failure	Perinephric hematoma due to right renal artery laceration	Blunt abdominal injury
M	41	Traffic accident	1 hours	Blunt abdominal injury, hemopneumothorax with pelvis fracture	Lung laceration / Liver laceration	Multiple injuries
M	27	Traffic accident	4 hours	Aortic transection with pelvis fracture	Hemothorax due to aortic transection	Aortic transection
M	27	Traffic accident	3 hours	Liver injury, speen, mesentery with hemothorax	Aortic laceration	Massive blood loss from liver injury
M	42	Fall from height	14 days	Traumatic brain injury	Pneumonia	Traumatic brain injury with complication
F	15	Traffic accident	14 days	Severe head injury	Pneumonia	Severe head injury with complication
M	34	Traffic accident	8 hours	Blunt abdominal injury with blunt chest injury	Subdural hemorrhage	Multiple injuries

Table 4. Detailed data regarding cases in major discrepancy groups (cont.)

Discrepancy class	Autopsy diagnosis					
	Head injury	Chest injury	Abdominal injury	Extremities & Pelvic injury	Natural disease	Total
Class I	0	3	1	0	2	6
Class II	1	3	2	0	3	9
Class III	4	7	2	1	9	23
Class IV	1	3	0	0	8	12
Total	6	16	5	1	22	50

Table 5. Autopsy diagnosis in each discrepancy class

Discussion

As it become more debatable about the usefulness of autopsy. There are many literatures focus on this point in varied place and time or samples of studies. The conclusions also varied in controversy.[2-11]

This study showed that autopsy could remain its important role as a standard diagnostic procedure in postmortem cases for complete information, especially in traumatic cases. We found major discrepancies in 7.1% of cases compare to the study in 1998-1999 which found 0% major discrepancies in trauma patients.[17] Another study in 2002 in medical cases also found 2% of cases to have major discrepancies.[18]

Even though the diagnostic procedures nowadays are much more accurate but that do not bring a considerable reduction in the incidence of misdiagnoses.[19] However, the results from reports should be viewed not as an indictment of the value of diagnostic procedures but as a caution against overreliance on them.[12] This study should be a point to raise awareness that patients with multiple traumas can have lethal lesions apart from a major diagnosis.[17]

In this study, most of the major discrepancies were found to be chest injuries (7.1%). A reason that might explain this result is that blunt chest trauma is difficult to be detected and diagnosed early in nature, especially dynamic injury, which the patients might have subtle external injury.

While some studies revealed that a prolonged hospital stay increases rates of misdiagnoses, others propose the opposite.[20-21] This study found no significant between the

discrepancy rate and the length of stay in hospital. However there was a tendency of the discrepancy in early death cases to be due to missed injuries, while in the late death cases, discrepancy could be detected in form of natural disease, including infection as a result of complications and the patient's underlying disease.

As for the natural diseases those were found to be the most common diagnosis in minor discrepancy groups, most of the cases were found to receive only supportive management for their poor prognosis, thus the investigations in these cases might not be completed to the last.

Conclusion

In summary, even there were much more improvement in diagnostic procedure and investigation tools than before, the discrepancy in diagnosis in dead patients still remain and need to be uncovered by autopsy as a gold standard diagnosis. It not only served for legal procedure but also take a part in hospital quality improvement, too. Our study revealed that the most major discrepancies in traumatic cases were blunt chest injury and mostly found in patients with multiple injuries which were not uncommon to be missed diagnosis.

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