The Thai Anesthesia Incidents Study (THAI Study) of Anesthesia Personnel Hazard

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Objectives: *To determine the incidence, causes, management, outcomes and corrective strategies for personnel hazard in Thai Anesthesia Incidents Study (THAI Study).*
Material and Method : *Personnel hazard incidents were extracted from the Thai Anesthesia Incidents Study (THAI Study) database conducted between February 1, 2003 and January 31, 2004 and analysed using descriptive statistics.*
Results : *Twenty-four incidents of personnel hazard were recorded. Majority of incidents occurred in nurse anesthetist (54.2%). Five incidents exposed to patient blood but no infection reported afterwards. Nineteen incidents (79.2%) were injury without contact to patient s blood or body fluid. Most of them were injured by broken ampoules. One case needed to leave from work for a while due to hand dysfunction.*
Conclusion : *Personnel hazard incidence were quite low frequency because of under-report. One case of morbidity was reported. Universal precaution and post exposure prophylaxis tended to minimize the risk of infection.*

Keywords : *Personnal hazard, Anesthesia, Perioperative, Multicenter study, Adverse events*

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Exposure to blood and body fluids that may be contaminated with infectious agents is a common occupational hazard for health care workers. Hepatitis B virus (HBV), Hepatitis C virus (HCV) and HIV are the most concern for occupational transmission agents. The risk of HBV, HCV and HIV transmission after accidental percutaneous exposure to infected blood are 37% - 62%, 1.8% (range 0%-7%) and 0.3% (95% CI : 0.2-0.5) respectively[1]. Needlestick injuries found to be the major risk for health care workers to expose those infections[2,3]. Anesthesia personnels are at intermediate to high risk due to procedures that they perform routinely such as intravenous catheter insertion, drug administration and lumbar puncture for spinal anesthesia. Additionally, most of the needles used in anesthetic practice are hollow-bore needles which provide higher risk of transmission compared to same diameter solid needle[4,5]. Even without occupational transmission of diseases, anesthesia personnels are still at risk of other injury while providing patient care like injury from broken glass ampoule, electrical shock, burn from monitoring equipment , receiving excess inhalation anesthetic agents.

In Thailand, occupational hazard in anesthesia personnel had not been studied before. Since Thai Anesthesia Incident Study (THAI Study) hosted by the Royal college of Anesthesiologist of Thailand conducted a prospective study about anesthetic adverse incident during 1 year period, anesthesia personnel hazard events were also included in the study to determine the incidence, cause, management after events and find out strategies to prevent or minimize the incident of occupational hazard in anesthesia practice.

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Material and Method

Thai Anesthesia Incidents Study (THAI Study) is a multi-centered study including 7 university hospitals, 5 tertiary care hospitals, 4 secondary care hospitals and 4 district hospitals. This study aimed to monitor the incidence of adverse events from 1 February 2003 to 31 January 2004. THAI Study was approved by the Institutional Ethical Review Board. Details of preanesthetic conditions, anesthetic management, intraoperative events and perioperative complications of consecutive patients within 24 hours were recorded on a standardized form.

Personnel hazard was considered to have occurred if any of anesthesia personnel (attending anesthesiologists, anesthesia residents, nurse anesthetists, medical students and nurse anesthetists trainee) was injured in perioperative period.

Details of incidents were recorded by attending anesthesiologists or nurse anesthetists in that hospital. Then the recorded forms were reviewed by 3 peer reviewers to identify causes, risk factors, contributing factors and suggested corrective strategies. Any controversy was discussed to achieve a consensus.

Details of events included type of exposure, exposure content, pathogen, injured person, treatment and outcome after incidents and factors promoting or reducing the severity of incidents. Data was analyzed by using descriptive statistics.

Results

Among 163,403 anesthetics during February 2003 to January 2004, twenty-four incidents (0.014%) of personnel hazard were recorded. There were 3 (12.5%) cases in university hospital , 17 (70.8%) cases in regional hospital and 4 (16.7%) cases in general hospitals respectively. No occupational hazard was reported in district hospital. Fourteen incidents (58.3%) occurred during day-time. All of the incidents occurred in operating room, mostly during induction(75%), followed by maintenance period (20.8%) and extubation (4.2%).

Injury occurred in 13 (54.2%) cases of nurse anesthetists, 7 (29.2%) cases of attending anesthesiologist, 3 (12.5%) cases of anesthesia residents and 1 (4.2%) case of nurse anesthetist trainee.

Only 5 incidents exposed to patient blood. One incident from blood splashed into attending anesthesiologist s eye during brachial plexus block attempted. Four cases (3 anesthesiologists and 1 nurse anesthetist) injuried by contaminated needles during spinal anesthesia attempt. Two of 4 were stucked by needle used for local infiltration. Two anesthesiologists were injured by spinal needle which one occurred by recapping the spinal needle. Regarding the pathogens, only 1 case (20%) were HCV, and the rest 4 cases(80%) were unknown. Only 1 patient s blood was sent for HIV serologic marker after event, which was found to be negative serology. Only 3 from 5 (60%) incidents, 2 needle stick injuries and 1 case of blood splashed into eye, were officially reported. Treatments that all personnel received were cleaning and dressing wound except one case received HIV prophylaxis. None of them was infected.

Nineteen incidents were occupational injury without contact to patient s blood or body fluid such as 3 cases injured from sterile needle stick injury, 13 cases injured from broken glass ampoules, 2 cases had contusion involving problem with arm rest, 1 case of skin scratched by patient nail during extubation.

In broken ampoules group, 9 nurse anesthetists,2 anesthesiologist,1 resident and 1 nurse anesthetist trainee were injured. All of them received treatment, 12 cases required only cleaning and dressing. 1 attending anesthesiologist and 1 resident required surgical consultation for suture wound and received analgesic and antibiotic. That resident needed to leave from work for a while due to hand dysfunction after incident.

Glass ampoules were propofol 4 (30.7%) cases, morphine 2 (15.4%) cases, atracurium 2 (15.4%) cases, atropine 2 (15.4%) cases, 0.5% heavy marcaine 1 (7.7%) cases, sterile water 1 (7.7%) case and unknown 1 (7.7%) case.

Discussion

The incidence of personnel hazard reported in this study was low, approximately 1 per 6808 patients or 0.014%. Sixty percent of anesthetic service were provided in university hospital, but only 3 incidents (12.5%) were reported in university hospital. Seventeen incidents (70.8%) and 4 incidents (16.7%), occurred in regional and general hospitals respectively. Similar to previous study [2,6,7] , the incidence were underreported especially when injured personnel thought the sharps were clean. Elmiyeh et al[6] demonstrated that 38% of health care worker in district general hospital experience at least one needle stick injury in 1-year period. Only 51% of them had reported. Kermode et al[8] reported similar result from India, demonstrated that 63% of health care worker experience at least one needle stick injury in 1-year period. Adegboye et al[9] reported 27% of health care worker experience at least one needle stick injury in 1-year period. In our

Table 1. Detail of events and injured personnel

Incident/ person	No. of case	%
Contaminated needlestick		16.6
anesthesiologist	3	
nurse anesthetist	1	
Splash into eye		4.2
anesthesiologist	1	
Clean needlestick		12.5
resident	1	
nurse anesthetist	2	
Broken glass ampoule		54.2
anesthesiologist	2	
resident	1	
nurse anesthetist	9	
student nurse anesthetist	1	
Contusion (arm rest)		8.3
anesthesiologist	1	
resident	1	
Other (patient s nail scratch)		4.2
nurse anesthetist	1	

study, only 7 needle stick injuries were reported which was quite low. Most of contaminated needle stick injured persons were anesthesiologists which were less likely to report even the systematic recording form was well established.

In serologic studies conducted in the United States during 1970s, health care worker had a prevalence of HBV infection approximately 10 times higher than the general population[1]. Several studies showed that mean prevalance of serologic hepatitis B marker in anesthesia personnel was 18 % (range 3.2% to 48.6%) compare to 1-2% in the general population in US[10] . Although HIV transmission is the most unwanted event for health care personnel but incidence is low compare to HBV and HCV transmission. In case exposed to patient blood, intervention as report exposure, education and appropriate post exposure prophylaxis should be provided by the hospital. In our study, 1 needle stick injury occurred by used needle left on the tray and another injury occurred while recapping spinal needle. Both incidents were considered to be preventable. By considering all patients may be HIV positive the universal precaution procedure should always be followed, such as never recapping needles, discarding sharps from tray or work place to appropriate container immediate after used, wearing gloves and glasses. Official report was done in only 3 from 5 cases (60%) with contaminated patient s blood . None of report in our study mentioned about post exposure prophylaxis especially for HBV except the one that received HIV prophylaxis. It seems to be no guideline practice for post exposure prophylaxis in most hospitals.

Nurse anesthetists were the most frequent injured group. Because most of our report came from regional and general hospital where majority of anesthesia personnel are nurse anesthetists. The incidents were mostly injured by broken glass ampoules. Majority of medication in anesthesia practice were prepared by nurse anesthetists that caused them at higer risk for getting injury. Propofol, atropine and atracurium ampoules were most common reported of broken ampoules. Attending personnel were asked to fill in whether the injury caused by poor technique of personnel or bad manufacturer design. Most of personnel stated that poor technique, careless, hurry and lack of protective device contributed to most of the injury.

Due to underreport, incidence of occupational hazard could not be estimated. Anesthesia personnel should be encouraged to promptly report injury incident. Post exposure prophylaxis should be set in hospital. Further study about prevalence of HBV, HCV and HIV-infection in anesthesia personnel should be done.

Conclusion

Our study demonstrated 24 occupation hazard in anesthesia practice which were potentially preventable. Additional education about universal precaution, using safety devices instead of sharp devices, using protective barriers and post exposure prophylaxis tended to minimize occupation risk in anesthesia personnel.

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ภยันตรายต่อบุคลากรระหว่างการให้ยาระงับการรู้สึกในประเทศไทย : การศึกษาแบบสหสถาบัน

อักษร พูลนิติพร, วราภรณ์ เชื้ออินทร์, ศิริลักษณ์ กล้าณรงค์, สมบูรณ์ เทียนทอง, ปานใจ อินพุ่ม

วัตถุประสงค์: *เพื่อหาอุบัติการณ์ สาเหตุ การรักษา ประเมินผลที่เกิด และปัจจัยที่เกี่ยวข้องกับการเกิดภยันตรายต่อบุคลากรทางการแพทย์ระหว่างการให้ยาระงับความรู้สึกในประเทศไทย*

วัสดุและวิธีการ: *ศึกษาข้อมูลของบุคลากรซึ่งได้รับภยันตรายระหว่างการให้ยาระงับความรู้สึกคัดเลือกมาจากข้อมูลการศึกษาของราชวิทยาลัยวิสัญญีแพทย์แห่งประเทศไทยซึ่งรวบรวมตั้งแต่ กุมภาพันธ์ พ.ศ. 2546 ถึง มกราคม พ.ศ. 2547 นำมาวิเคราะห์ทางสถิติเชิงพรรณนา*

ผลการศึกษา: *พบว่ามีภยันตรายเกิดแก่บุคลากรระหว่างการให้ยาระงับความรู้สึกจำนวน 24 ราย ส่วนใหญ่เกิดกับวิสัญญีพยาบาล (54.2%) พบบุคลากร 5 รายมีแผลสัมผัสกับเลือดของผู้ป่วยแต่ไม่มีรายงานการติดเชื้อในภายหลัง บุคลากร 19 ราย(79.2%) ได้รับบาดเจ็บโดยไม่สัมผัสกับเลือดหรือสารคัดหลั่งของผู้ป่วย ส่วนใหญ่ได้รับบาดเจ็บจากการตอกขวดยา บุคลากร 1 รายต้องพักงานชั่วคราวเนื่องจากมือใช้งานไม่ได้*

สรุป: *อุบัติการณ์เกิดภยันตรายต่อบุคลากรทางการแพทย์ระหว่างการให้ยาระงับความรู้สึกพบน้อยเนื่องจากการรายงานต่ำกว่าความเป็นจริง ไม่พบว่ามีอันตรายอย่างรุนแรง การป้องกันตัวแบบ universal precaution และการให้ยาป้องกันการติดเชื้อหลังสัมผัสเชื้อโรคร้ายแรงน่าจะช่วยลดโอกาสติดเชื้อได้*