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Medico-legal aspects in the expertise of anesthesia related death

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Abstract

A 32-years-old healthy woman in a small town hospital dies during the delivery of her second child. Delivery has been with elective cesarean and death occurred in the phase of preanesthesia. The autopsy showed clear signs of endotracheal intubation. A question arose: Are there indications for physician negligence and how big is their responsibility for this tragic death.
In this paper, through the presentation of this particular case, we also made a review of the literature discussing anesthesia related death. The aim and discussion of this paper are directed towards the medico-legal aspects of anesthesia related death. The main question is, when the death is result of an error as an element of medical malpractice and when it is result of complications and circumstances that could not have been avoided.
This presentation and review emphasizes the most important medico-legal aspects of anesthesia related death, particularly death in an obstetric patient showing the complexity and comprehensiveness of this kind of forensic medicine expertise.

Key words: medico-legal expertise, anesthesia related death

Súdnolekárske aspekty expertízy úmrtia v súvislosti s anestéziou

Abstrakt

Zdravá 32-ročná žena zomrela v malej mestskej nemocnici pri pôrode svojho druhého dieťaťa. Pôrod sa uskutočnil elektívnym cisárskym rezom a smrť nastala vo fáze preanestézie. Pitva ukázala jasné známky endotracheálnej intubácie. Vyvstala otázka: Existujú náznaky nedbanlivosti lekárov a aká veľká je ich zodpovednosť za túto tragickú smrť.
V predkladanej práci sme prezentáciu tohto konkrétneho prípadu doplnili o prehľad literatúry opisujúcej prípady úmrtí spojených s anestéziou. Cieľ a diskusia tohto príspevku sú zamerané na medicínsko-právne aspekty smrti súvisiacej s anestéziou. Hlavnou otázkou je, kedy je smrť dôsledkom chyby ako prvku lekárskeho pochybenia a kedy je výsledkom komplikácií a okolností, ktorým sa nedalo zabrániť.
Uvedená prípadová štúdia a literárny prehľad poukazujú na najdôležitejšie medicínsko-právne aspekty úmrtia súvisiaceho s anestéziou, najmä úmrtia u pacientky v súvislosti s pôrodom, čo zdôrazňuje zložitosť a komplexnosť tohto druhu súdnolekárskej expertízy.

Kľúčové slová: súdnolekárska expertíza, úmrtie v súvislosti s anestéziou

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Introduction

“To err is only human” is one of the substantial postulates of humanity. Anyway, we are aware that some errors are more important than others. Talking about medical malpractice, every error is associated with some impairment of the patient’s health, and when talking about malpractice in anesthesiology, it is often related to death.

Due to this apparent significance, the medico-legal aspects in anesthesia related death are widely discussed and treated in international literature (1-7). There have been prepared studies, guidelines and algorithms, which can help resolving whether death occurred due to an error, as an element of malpractice, or it is a result of complications and/or circumstances that are sometimes unavoidable and out of the responsibilities of the anesthesiologist (7).

This article presents the medico-legal aspects of anesthesia related death, with several aims: deeper consideration of the definition of medical malpractice; clear distinction between anticipated and non-anticipated complications as indicators of malpractice; staffing of the expert team for this type of medico-legal expertise, as well as emphasizing of the scientific approach in this complex forensic medicine expertise relying upon the principles of *evidence based medicine*.

Case history

A young (32) healthy woman in a small town hospital dies during delivery of her second child. Delivery has been performed in the 39 gestational week with elective cesarean without any obvious medical indication for cesarean (the initial data show that her first delivery was spontaneous but finished with vacuum extraction). Pathophysiological mechanisms leading to death developed in the phase of preanesthesia. The medical team, consisting of two anesthesiologists and two gynecologists, managed to extract a female newborn (3120 grams, 51 cm), who, after a period of resuscitation, has been also pronounced dead.

Additional data obtained from the police investigation show that the two doctors – anesthesiologists have been found with ethyl alcohol in their blood samples.

The death of an obstetric patient and her newborn in such tragic circumstances initiated extreme public distress.

The mission of the medico-legal experts is very difficult. On one side, there is a tragic death of a woman and her newborn and on the other side, are four experienced doctors accused of medical malpractice, facing a penalty of four years imprisonment and ban for doctor’s professional practice. The pressure of the official authorities investigating the case, as well as the public pressure, has been enormous, additionally complicating the position of the experts.

The work of the two doctors (the anesthesiologists) under alcohol influence is an apparent negligence. However, the medico-legal expertise has been directed towards the main question: have they done anything wrong with their medical interventions to cause this tragic death?

The medico-legal expertise of the case

Autopsy findings. At this first phase of expertise, the autopsy, we have been focusing strictly on the concrete cause of death and refused to talk about other circumstances that authorities have been actually interested in the most: are there any indications for medical malpractice?

During the **external examination** were found clear signs of asphyxiation death: extreme cyanosis, subconjunctival suffusion, bloody content from the nostrils, distension of the abdomen, and marks of post cesarean surgery (Fig. 1 a - c).

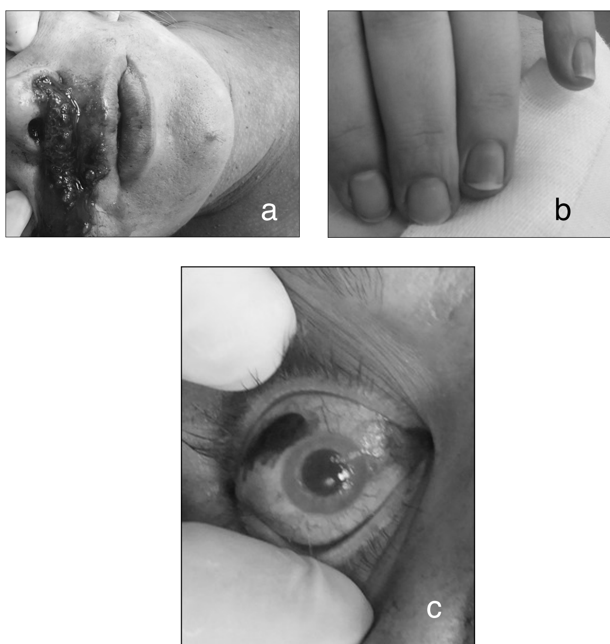
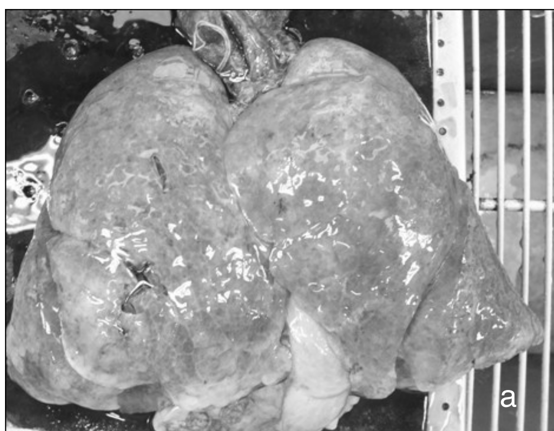
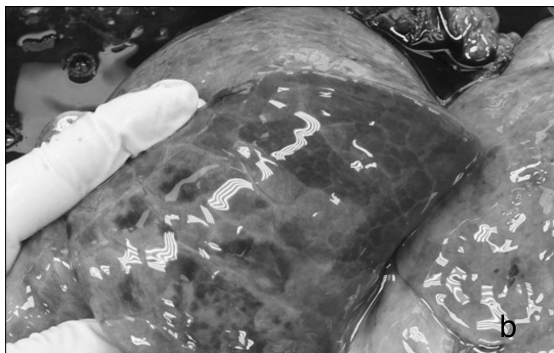


Fig. 1. Clear signs of asphyxiation death: a. cyanosis of the lips (*cyanosis labialis*); b. cyanosis under the nails (*acrocyanosis*); c. subconjunctival suffusions.

The **internal examination** showed also common signs of asphyxiation, altogether with: hematoma to the root of the tongue, erosion of the oesophageal mucosa with very characteristic appearance, extreme distension of the stomach and distension of the intestine and colon. The mucosa of the glottis was oedematous and hyperaemic (Fig. 2 a - e).





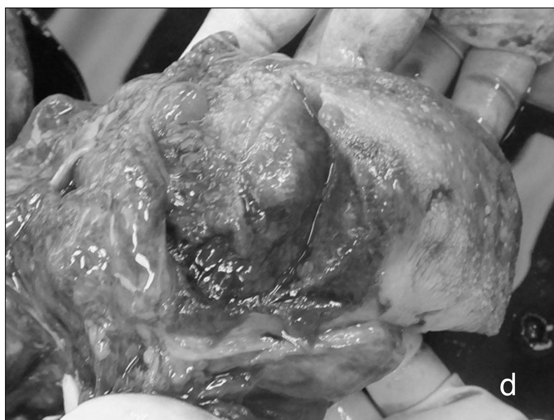


Fig. 2. Examination of the internal organs:
a. hyperinflation of the lungs;
b. subpleural bleedings (ecchymoses);
c. distension of the stomach;
d. hematoma to the root of the tongue;

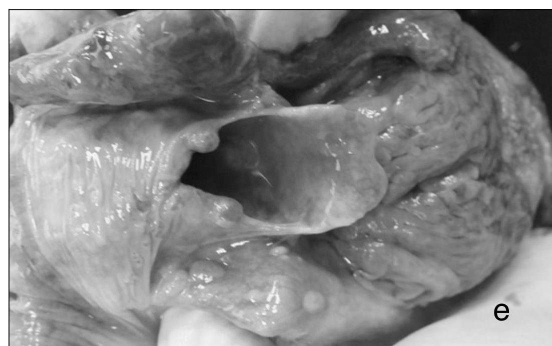
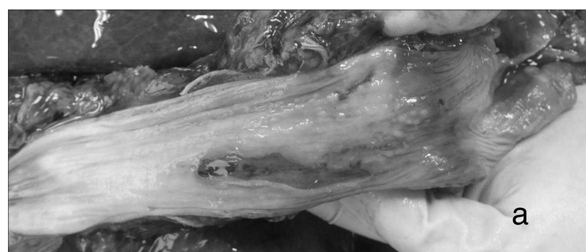


Fig. 2 e**.** apparent hyperemia of the glottis.

Trauma of the upper airway, haematoma to the root of the tongue and erosion of the oesophageal mucosa was obvious. Furthermore, the erosion of the oesophageal mucosa had a very characteristic shape, suggesting iatrogenic injury caused by endotracheal tube (Fig. 3 a, b).



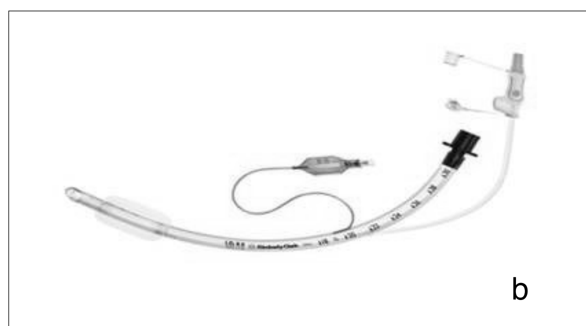


Fig. 3. Characteristic shape of the esophageal mucosa (a) suggesting the injury caused by the endotracheal tube (b).

Laboratory results showed presence of barbiturates in therapeutic doses (given as preanesthesia) without presence of any deep anesthetics.
The **cause of death** has been established to be asphyxiation due to cessation of oxygen supply.
Conclusion of the autopsy: the sequence of events leading to asphyxiation and subsequent death occurred in the phase of preanesthesia. It has been connected to the process of intubation of the patient. The patient apparently experienced an esophageal intubation.

Discussion

Comparison of the autopsy findings with the circumstances of death. Since the forensic medicine team refused to make any conclusions about the manner of death (is it a result of malpractice or not) just upon the autopsy findings, two months after the autopsy we received the whole court material (material and verbal evidences) to perform forensic medicine expertise and answer a total of 22 questions of the prosecutor.
They can be summarized in three key questions:
1. Are there indications for negligence as a possible element of malpractice in the actions of the doctors? Have their actions been in accordance with the medical protocols and guidelines, or there have been some distortions causing the event?
2. Does oesophageal intubation represents possible and anticipated complication in anesthesiology?
3. The causal correlation between the actions of the doctors and the patient's death.

Key questions 1. and 2. Medical malpractice is medical negligence of the doctor (or the medical team), when he/she comes out of the standard prescribed procedures and protocols, causing worsening i.e. damage of the human health or death. Hence, two components are involved in the definition: 1. coming out of the standard protocols, and 2. worsening of the human health. Medical malpractice is closely related to the medical negligence i.e. conscious or unconscious leaving of the standard rules and procedures. Medical malpractice is a subject of the civil torts. Only when there is a medical error underlying the medical malpractice, it can be considered as criminal act.
Taking that into account, we had to examine in our expertise all actions and behavior made by every member of the medical team, comparing them to the already accepted standards and protocols. Therefore, an experienced anesthesiologist has been included to the expert team.
Evaluating the verbal and material evidences in this particular case, we found out that, after facing a "difficult intubation" in the 32-years-old obstetric patient, the anesthesiologist in duty made three attempts for intubation. Then, he asked for an assistance by his colleague, who was not actually on duty that day and who made few more attempts (we are not aware of the exact number) for intubation.

What do standard protocols say about this? Scientifically, **difficult intubation** occurs when it requires more than three attempts and/or more than 10 minutes of time for proper insertion of endotracheal tube with conventional laryngoscopy. It has an incidence of 64 per 1000 parturient, namely 1 in 16 parturient (3). If the intubation fails, we have a case of **failed intubation** i.e. inability to place the endotracheal tube. It occurs in approximately 1,3 - 3 per 1000 of obstetric patients (1 to 500 (1); 2,3 to 1000 or 1 to 443 (4)).

Maternal mortality from failed intubation is 2.3 per 100 000 cesarean sections namely 1 death per 90 failed intubations (4). According to this statistics, the incidence for failed and difficult intubation is 10 times higher in obstetric patients. There are reports that 50% of anesthesia related death occur in obstetric patients. This is due to some anatomical and physiological specifics that are present in the obstetric patients. Anatomic: weight gain during pregnancy; increase in breast size; respiratory mucosal oedema and increased risk for pulmonary aspiration. Physiologic: 20 - 30% higher oxygen consumption; reduced total compliance of the chest, also reduction of the functional residual capacity, all of these conditioning parturient to desaturate at higher rate than non-pregnant woman (4).
"Failed tracheal intubation in obstetric anesthesia is every anesthesiologist's nightmare" (3). All these risks are actually the reason why patients are signing written consent prior anesthesiology admission. Actually, that is the reason why the general anesthesia is largely avoided nowadays in the cesarean section and the regional one is recommended.
Obstetric Anesthetists Association and the Difficult Airway Society created Master algorithms for managing the crisis caused by failed tracheal intubation in general anesthesia of obstetric patients.
As previously said, **difficult intubation** and **endotracheal intubation** is not a rare event in general anesthesia, particularly in obstetric patients due to their specifics. It is an anticipated complication in these patients and reason why general anesthesia in cesarean section should be avoided (5, 6). As an anticipated complication, endotracheal intubation itself is not an act of negligence and therefore is not an element of medical malpractice. However, the responsibility of the anesthesiologist doesn't stop here. Actually, after the occurrence of crisis, of vital importance are his/her skills and his/her knowledge to adequately deal with the crisis. Clinicians must be prepared to recognize and manage the crisis. This is exactly the reason why the protocols and algorithms are given (7).

3. The causal correlation between the actions of doctors and patient's death. The third key question to be answered with our expertise has been to determine the causal correlation between the actions of the doctors-anesthesiologists and the fatal outcome of the obstetric patient and her new-born. Even though the evidence from the literature showed that endotracheal intubation is especially risky moment in the general anesthesiology of obstetric patients and is considered as anticipated complication, when it occurs, anesthesiologists must follow proper protocols and algorithms in order to overcome the situation. Their actions have to be appropriate and purposefully directed towards overcoming the crisis. In this part, after the evaluation of the material and verbal evidences in the presented case, some pitfalls and exiting of the prescribed

algorithms and protocols have been found. Among them, the most obvious one was the number of attempts for intubation made by the doctors, which has been found to be far more than three and much longer than 10 minutes. Instead of the persistent attempts for intubation, suggested by the protocols, there is a necessity for undertaking of more advanced and more sophisticated methods for obtaining of patient's airway, sometimes even front neck surgery. Unfortunately, such measures hadn't been undertaken in the presented case and doctors didn't succeed to overcome the situation.

Conclusion

When performing a medico-legal expertise for possible medical malpractice, it is very important to involve adequate experts. Involving experienced professionals and practitioners in anesthesiology is an important prerequisite for the expertise of anesthesia related death.

A scientific approach, relying upon the rules of Evidence Based Medicine, is essential with this kind of expertise. Wide evaluation of literature and studies published in the relevant journals is necessary, in a purpose of increasing the objectivity of the expertise.

It is of crucial importance to determine, if the poor outcome is a result of medical malpractice or it is a result of complications that are not necessarily related to negligence of the medical team. It has to be clarified, which part of the crisis occurred due to complications and which part occurred due to the capability of the doctors to manage the crisis and it must be presented in a balanced manner to the legal authorities.

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