VIA MEDICA

LETTERS TO EDITOR

Anaesthesiology Intensive Therapy
2015, vol. 47, no 4, 430–432
ISSN 0209–1712
10.5603/AIT.2015.0058
www.ait.viamedica.pl

Remarks to The consensus statement of the Paediatric Section of the Polish Society of Anaesthesiology and Intensive Therapy on general anaesthesia in children under 3 years of age

Magdalena Mierzewska-Schmidt[1], Marcin Rawicz[2], Artur Baranowski[1]

[1]*Department of Paediatric Anaesthesiology and Intensive Care, Medical University of Warsaw, Poland*
[2]*Warsaw Hospital for Children, Poland*

To the Editor:

In "Anaesthesiology Intensive Therapy", issue 3/2014, the Consensus Statement of the Paediatric Section of the Polish Society of Anaesthesiology and Intensive Therapy (PTAiIT) on general anaesthesia in children below 3 years of age was presented [1]. As rightly stressed by the authors, anaesthesia in children, especially those who are young, is a challenge for anaesthetists who normally deal with adults. Furthermore, the incidence of complications, some of them life threatening, in this age group is higher, particularly if anaesthetists have limited experience in paediatric anaesthesia. Therefore, the task undertaken by the Paediatric Section of PTAiIT is extremely important.

The formulation of management guidelines and standards, including national guidelines adjusted to local conditions, is an important step in order to improve the safety of patients. The authors should be appreciated for their enormous input of work and many valuable practical guidelines that may be of help to anaesthesiologists with little experience in paediatric anaesthesia and residents specialising in anaesthesiology. As the paper provides information concerning anatomical and physiological differences, perioperative management, as well as the anaesthesia equipment and conditions required, it should be mandatory reading for all anaesthesiologists administering paediatric anaesthesia.

However, in our opinion, some recommendations presented in the paper require slight adjustments while others are controversial. It would also be advisable that the guidelines be accompanied by the grades of recommendation in accordance with the EBM rules.

The blood group of a mother, in addition to that of a child, has to be determined not only in newborns but also in infants up to 4 months of age.

As far as preoperative fasting is concerned, although the authors recommend 2 hours for clear liquids, their maximum volume was set at 10 mL kg^{-1} up to max. 100 mL („2 hours before the induction of anaesthesia, the child can eat/drink clear liquids (10 mL kg^{-1}, max. 100 mL per portion), whereas the European guidelines (as well as the ones developed in the USA, Australia, Great Britain or French-speaking countries) allow an unlimited supply of clear liquids, as it has been proven beyond any doubt that such practice does not increase the gastric residual volume and the pH of gastric contents rises. Therefore, drinking clear liquids prior to anaesthesia does not increase, but decreases the risk of aspiration, not to mention that it improves the patient's comfort level. Moreover, as the level of evidence was marked 1++ and the grade of recommendation — A, we believe that the Polish guidelines should be adjusted to the commonly used evidence-based practice [2].

Indications for postponement of the planned procedure should be sometimes considered on an individual basis. The authors recommend a 2-week interval following the discontinuation of antibiotic therapy. In our opinion, the stress should be placed on the reason for the antibiotic therapy rather than the fact of its application (some doctors prescribe antibiotics too hastily; antibiotic therapy prescribed due to urinary infections should be considered differently than, for example, that administered for pneumonia). It would also seem appropriate to mention an increased risk of respiratory complications after recent lower respiratory tract infections, e.g. bronchitis or pneumonia (regardless whether the antibiotic therapy was used or otherwise) or associated with airway hyperactivity. In the case of the whooping cough (pertussis) discussed in the article, the recommended interval of 21 days from the onset of symptoms, or 6 days from the introduction of antibiotic therapy, seems highly insufficient. The symptoms of uncomplicated and properly treated whooping cough persist for at least 6 weeks, and bronchial hyperactivity even longer. Therefore, the recommendation to postpone the planned procedure for 6–10 weeks when the symptoms abate seems overstated [3].

In our opinion, the management guidelines regarding procedures in small children "with a full stomach", i.e. rapid sequence induction (RSI), are a crucial flaw. The "classic" version of RSI in children using the Sellick manoeuver and avoiding mask ventilation suggested by the authors has recently been subject to criticism [4]. Most alarming is the statement concerning the avoidance of facemask ventilation. As preoxygenation of a small, uncooperative child is not always effective, and the oxygen reserve is lower than that in older children and grown-up patients, a lack of ventilation during this period often leads to hypoxia. Therefore, in clinical practice, children "with a full stomach", especially those who are younger, should be, prior to intubation, mask-ventilated with small volumes and pressures in order to prevent saturation decreases and cases of prolonged intubation. As this scenario is particularly dangerous and stressful for anaesthesiologists with little paediatric experience, they should ventilate children's lungs delicately. Knowing that ventilation is feasible, the anaesthesiologist works without the stress caused by decreasing saturation and does

not intubate prematurely, before the child falls asleep and muscle relaxation develops, which is the most common cause of vomiting and aspiration [5]. This management technique, known as controlled rapid sequence induction, seems safer than the traditional one in the youngest patients that require quick induction. The above has been confirmed by a recent study involving over 1000 cases of induction in children with full stomachs using atracurium. Its action is not reversed by sugammadex and it is characterised by longer onset time, compared to rocuronium [6]. We believe that nowadays, when muscle relaxation can be reversed with sugammadex, the safest option is intubation following the administration of rocuronium, a drug much safer than suxamethonium and displaying a similar onset of action. In newborns, where surgery has to be short and extubation is planned, the only option is atracurium. Rocuronium can be used as well; yet it has to be remembered that smaller doses are needed and that drug action is longer. Suxamethonium is not recommended in newborns due to its very short action, the higher doses which are required and its substantial side effects (predominantly bradyarrhythmias) [7]. Dosage recommendations also raise concern. The suggested dose of propofol for RSI, i.e.1–2 mg kg^{-1} , is definitely too small; the appropriate dose for newborns is 3–5 mg kg^{-1} and for those slightly older namely, 2–3-year-olds, approx. 3 mg kg^{-1} [8]. Likewise, in the case of suxamethonium, younger children require a higher dose, i.e. approx. 2 mg kg^{-1}.

Although the Consensus Statement of the Paediatric Section recommends the use of the Sellick manoeuver, its effectiveness has been questioned and it has even been suggested that it may interfere with intubation and ventilation. As stated in Part 14 of Pediatric Advanced Life Support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: "There is insufficient evidence to recommend routine cricoid pressure application to prevent aspiration during endotracheal intubation in children. Do not continue cricoid pressure if it interferes with ventilation or the speed or ease of intubation" (Class III, LOE C). Therefore, many authors no longer recommend its use [4, 6, 9].

Another controversial issue is the type of endotracheal tubes to be employed. It is currently believed that both cuffed and uncuffed tubes are safe. It should be remembered, however, that the cuffed tube should be one size smaller and the sealing cuff pressure should be controlled. Moreover, the recommended sizes in Figure 1 differ from those given in Table 6 (the latter being the correct ones) [1].

According to the European guidelines, it is not recommended to use pharmacological methods to prevent aspiration in patients with a full stomach (with the exception of pregnant women), including the use of metoclopramide, antacids and histamine antagonists of the level of evidence 1++ and grade of recommendation A [2]; hence Polish recommendations stand in contradiction [1]. As far as the recommendations for endotracheal intubation are concerned, we cannot agree with the statement that muscle relaxation is contraindicated in preterm newborns. The clinical practice of our centre and literature data [9] indicate that muscle relaxation facilitates intubation and makes it atraumatic. A comparative study concerning the intubation of preterm newborns with fentanyl and rocuronium muscle relaxation or otherwise has revealed a higher effectiveness of first–attempt intubation in children with muscle relaxation [9]. This technique is obviously recommended for anaesthesiologists experienced in neonatal intubation and airway management. Moreover, careful oxygenation of preterm newborns is emphasised. It is difficult to say how this could be carried out, especially in such small children intubated for emergency indications (in this age group surgical procedures are usually avoided if they can be postponed), who are often in a bad general condition, with a particularly low oxygen reserve. It should be reminded that hypoxia in this age group quickly leads to bradycardia, decreased cardiac output (newborns are not capable of increasing the stroke volume in response to slowed heart rate), and even cardiac arrest. In such cases, the lack of preoxygenation or preoxygenation with lower oxygen concentrations will inevitably shorten the time before the development of hypoxia and the time to carry out a safe intubation. The risk of hypoxia consequences seems to prevail over a potential risk of toxicity of oxygen administered in high concentrations for few minutes (or a very short time).

In the passage regarding postoperative pain, Table 10 recommended dosages of opioids administered in continuous infusions. We believe that this pertains to children ventilated mechanically; however, such a statement has not been included in the paper. In children breathing spontaneously, opioid doses should usually be lower. The dosage range is high, while in newborns that are to breathe spontaneously after surgery, the initial infusion dose should be 5–10 μg kg^{-1} h^{-1}. Additionally, it should also be stressed that in the case of opioids supplied in continuous infusions, close monitoring in the recovery room and in the intensive care unit is essential.

We hope that the publication of our letter will deepen the discussion on important aspects of safe anaesthesia of the youngest patients.

ACKNOWLEDGEMENTS

1. The authors declare no financial disclosure.
2. The authors declare no conflict of interest.

References:

1. Manowska *M, Bartkowska-Śniatkowska A et al.;* Polish Society of Anaesthesiology and Intensive Therapy: The consensus statement of the

Paediatric Section of the Polish Society of Anaesthesiology and Intensive Therapy on general anaesthesia in children under 3 years of age. Anaesthesiol Intensive Ther 2013; 45: 119–133. doi: 10.1097/EJA.0b013e3283495ba1.
2. *Smith I, Kranke P, Murat I et al.;* European Society of Anaesthesiology: Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology. Eur J Anaesthesiol 2011; 28: 556–569. doi: 10.1111/pan.12544.
3. *Modak RK*: Pertussis (whooping cough). In: *Fleisher LA, Roisen MF* (ed.): Essence of anesthesia practice. Philadelphia 2010, chapter 252.
4. *Engelhardt T*: Rapid sequence induction has no use in pediatric anesthesia. Paediatr Anaesth 2015; 25: 5–8. doi: 10.1111/pan.12544.
5. *Warner MA*, *Warner ME*, *Warner* DO, *Warner* LO, *Warner EJ:* Perioperative pulmonary aspiration in infants and children. Anesthesiology 1999; 90: 66–71.
6. *Neuhaus D, Schmitz A, Gerber A, Weiss M:* Controlled rapid sequence induction and intubation — an analysis of 1001 children. Paediatr Anaesth 2013; 23: 734–740. doi: 10.1111/pan.12213.
7. *Rawicz M, Brandom BW, Wolf A*: The place of suxamethonium in pediatric anesthesia. Paediatr Anaesth 2009; 19: 561–570. doi: 10.1111/j.1460-9592.2009.03032.x.
8. *Steur RJ, Perez RS, De Lange JJ:* Dosage scheme for propofol in children under 3 years of age. Paediatr Anaesth 2004; 14: 462–467.
9. *Allen KA:* Premedication for neonatal intubation: which medications are recommended and why. Adv Neonatal Care 2012; 12: 107–111. doi: 10.1097/ANC.0b013e31824c1583.
10. *Feltman DM, Weiss MG, Nicoski P, Sinacore J:* Rocuronium for nonemergent intubation of term and preterm infants. Perinatol 2011; 31: 38-43. doi: 10.1111/pan.12213.

Corresponding author:
Magdalena Mierzewska-Szmidt
Department of Paediatric Anaesthesiology and Intensive Care
Medical University of Warsaw
ul. Marszałkowska 24, 00-576 Warszawa, Poland
e-mail: mcdosia@gmail.com

Anaesthesiology Intensive Therapy
2015, vol. 47, no 4, 432–433
ISSN 0209–1712
10.5603/AIT.2015.0059
www.ait.viamedica.pl

Reply:

Małgorzata Manowska[1], Alicja Bartkowska-Śniatkowska[2], Marzena Zielińska[3], Krzysztof Kobylarz[4], Andrzej Piotrowski[5], Wojciech Walas[6], Bogumiła Wołoszczuk-Gębicka[7]

[1]Department of Anaesthesiology and Intensive Therapy, Children`s Memorial Health Institute in Warsaw, Poland
[2]Department of Paediatric Anaesthesiology and Intensive Therapy, Karol Marcinkowski University of Medical Sciences in Poznań, Poland
[3]Department of Paediatric Anaesthesiology and Intensive Therapy, University Hospital in Wroclaw, Poland
[4]Department of Anaesthesiology and Intensive Therapy, University Children Hospital in Cracow-Prokocim, Poland
[5]Department of Intensive Therapy and Anaesthesiology, Medical University in Łódz
[6]Department of Paediatric and neonatal Anaesthesiology and Intensive Therapy, Regional Medical Centre in Opole, Poland
[7]Department of Anaesthesiology, Intensive Therapy and Post-operative Care, University Children Hospital in Warsaw, Poland

To the Editor:

We have read with great interest the letter of our colleagues from the Warsaw centre, being a valuable commentary on the Consensus Statement of the Paediatric Section of the Polish Society of Anaesthesiology and Intensive Therapy on general anaesthesia in children below 3 years of age.

We do agree with the majority of their observations; however, it is worth pointing out that the views presented by the authors of the letter, especially those concerning rapid sequence induction were first widely discussed in September 2013 during the ESPA European Congress, i.e. after the discussed guidelines had been published. The majority of papers dedicated to this subject published until 2012, which formed the basis for our position, have recommended the classic approach to the problem, including the avoidance of active facemask ventilation.

The comment on determination of blood groups of the mother and child until it reaches 4 months is obvious to us.

The decision to postpone planned general anaesthesia due to recent infections of the upper or lower respiratory tract of small patients is indisputable. The period of two weeks following subsidence of such infections is a requisite minimum, which was reported, *inter alia*, by Von Ungern-Sternberg B *et al.* [1], who assessed the most frequent causes of complications in paediatric anaesthesia. It is obvious to the authors that it is not the question of two weeks from the moment antibiotics are discontinued but of the hyperactivity of child's airway which lasts for at least two weeks after the infection, especially that not all infections have to be treated with antibiotics. The above has also been discussed by Lerman [2]. Table 3 covers antibiotic therapy as one of the elements disqualifying a planned anaesthetic procedure due to respiratory infections, another being acute rhinitis with such symptoms as airway secretion or elevated body temperature, and not as a condition *sine qua non,* necessary to postpone surgery and anaesthesia. We do agree that antibiotic therapy tends to be overused in paediatric hospitals and the decisive factor is the patient's clinical condition.

We fully agree with the comment concerning clear liquids two hours prior to anaesthesia. An *ad libitum* supply of clear liquids (without volume restrictions) is indeed recommended by the majority of societies, both British and American. The controversial maximum volume of 100ml was provided in the guidelines as an expression of a compromise regarding the views of individual authors of the guidelines, based on theoretical knowledge, as well as their professional experience. Although we realize that the strength of recommendations formulated based on expert's opinions is rated lowest on the EBM scale, it is difficult not to consider it at all.

Even though suxamethonium is not recommended in newborns, this does not mean it cannot be used in exceptional cases. George Meakin [3] has confirmed that the risk of side effects, such as tachycardia, bradycardia, hyperkalemia, increased intraocular pressure, myoglobinaemia or malignant hyperthermia in patients with muscular dystrophy, is high. For these reasons, in accordance with the FDA guidelines, the administration of suxamethonium in (all) children should be limited to emergency intubations, e.g. laryngeal spasm, full stomach, difficult airway. Similar recommendations have been proposed by the authors of the Consensus Statement discussed.

We agree with the authors of the letter as to the risk of rapidly developing hypoxaemia, especially in the youngest patients. We cannot stay, however, indifferent to the risk of hyperoxaemia and complications related to it. Unfortunately, the overuse of very high concentrations of oxygen in all age groups is common. The toxicity of oxygen and its involvement in the development of retinopathy of prematurity and chronic lung disease have been frequently stressed in medical literature [4], whereas atelectasis resulting from pure oxygen ventilation has been excellently documented by Prof. Goran Hedenstiern.

We are aware of continuous evolution of guidelines and opinions in all branches of medicine, including paediatric anaesthesiology. Our further task is to update the guidelines so that they reflect the current state of knowledge. We will take into account both the comments of the authors of the letter and the impatiently anticipated results of the recently completed APRICOT study, probably the biggest one in Europe, which assesses anaesthesiological procedures as well as the incidence and causes of complications of general anaesthesia in the European paediatric population.

ACKNOWLEDGEMENTS

3. The authors declare no financial disclosure.
4. The authors declare no conflict of interest.

References:

1. *von Ungern-Sternberg BS, Boda K, Chambers NA et al.:* Risk assessment for respiratory complications in paediatric anaesthesia: a prospective cohort study. Lancet 2010; 376: 773–783. doi: 10.1016/S0140-6736(10)61193-2.
2. *Lerman J:* Preoperative assessment and premedication in paediatrics. Eur J Anaesthesiol 2013; 30: 645–650. doi: 10.1097/EJA.0b013e328360c3e2.
3. *Meakin G:* Neuromuscular blocking drugs in infants and children. Continuing Education in Anaesthesia. CEAACP 2007; 7: 143–147.
4. *Martin DS, Grocott MP:* Oxygen therapy in critical illness: precise control of arterial oxygenation and permissive hypoxemia. Crit Care Med 2013; 41: 422–432. doi: 10.1097/CCM.0b013e31826a44f6.

Corresponding author:
Małgorzata Manowska, MD, PhD
Klinika Anestezjologii i Intensywnej Terapii
Instytut-Pomnik Centrum Zdrowia Dziecka
Aleja Dzieci Polskich 20, 04–730 Warszawa, Poland
tel.: 601 237 560
e-mail: m.manowska@czd.pl

Anaesthesiology Intensive Therapy
2015, vol. 47, no 4, 433–435
ISSN 0209–1712
10.5603/AIT.a2015.0019
www.ait.viamedica.pl

A combination of KingVision videolaryngoscope and flexible fibroscope for awake intubation in patient with laryngeal tumor — case report and literature review

Tomasz Gaszyński

Department of Emergency Medicine and Disaster Medicine, Medical University of Łódź, Poland

Sir,

Intubation of patients with a supraglottic mass causing an obstruction of the glottis is difficult even for experienced anesthesiologists. We present our case of combined use of KingVision videolaryngoscope (King Systems, Noblesville, USA) and flexible fibroscope for awake intubation of patient with laryngeal tumor. Patient`s written consent was obtained for publication. A 83-yrs old male was admitted to Department of Laryngology at Barlicki University Hospital, Poland for treatment of laryngeal tumor. Patient had former history of treatment of laryngeal cancer with radiotherapy. At moment of admission patient suffered from sore throat, problems with speaking and sleep disturbances caused by respiration difficulties. He was scheduled for urgent tracheostomy. Because of radiotherapy typical attempt of tracheostomy under local anesthesia was not possible. Following discussion with specialist he was scheduled for tracheostomy under general anesthesia with endotracheal intubation. After larynx indirect examination it appeared that entrance to larynx is not visible and tumor mass is covering epiglottis and entrance to larynx. This was confirmed in CT scans. It was decided to perform awake fibroptic intubation under local anesthesia. Patient was anesthetized using 4% lidocaine spray topical anesthesia in typical method for bronchoscopy. A 0.1 mg of fentanyl and 0.5 mg of atropine was adminis-

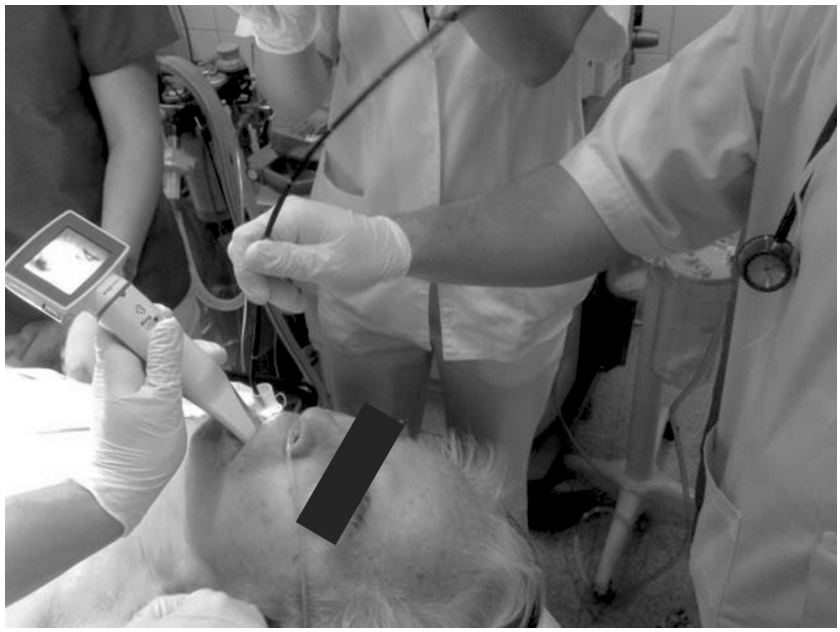

Figure 1.

trated iv. Dexmedetomidine infusion was commenced with loading dose of 1 μg kg^{-1} over 10 minutes and then at ratio 0.5 μg kg^{-1} h^{-1}. Awake fiberoptic intubation was started as soon as the patient reached a Ramsay sedation scale score of 4. An experienced brochoscopist was attempting fibroptic intubation (Lipp-Golecki set intubation fibroscope, Karl Storz, Tuttlingen, Germany). Unfortunately he could not find entrance to larynx not from oral nor from nasal approach. We decided to use KingVision videolaryngoscope to attempt visualization of entrance to larynx. When introducing gently videolaryngoscope it was possible to elevate tumor mass with the tip of videolarygoscope blade and visualize entrance to larynx. Then the fibroscope was introduced in the ET tube channel of videolaryngoscope and proceeded to the trachea (Fig. 1). Patient was intubated with ET tube no 7 with no complications and general anesthesia was commenced with propofol infusion. Surgery and perioperative period was uneventful.

To the best of our knowledge it is first report of combine use of KingVision videolaryngoscope and flexible fibroscope for awake intubation. Greib *et al*. [1] used DCI videolaryngoscope (Karl Storz, Tuttlingen, Germany) which is very different in construction and operation to KingVision which is from the group of videolaryngoscopes with ET tube chanel incorporated into blade. We used similar method of local anesthesia for our patient with success. Additional opioid is very effective to attenuate reflexes from posterior wall of pharynx and entrance to larynx during fibroscopy. Xue *et al*. [2] reported 13 cases of awake combined Glidescope — fibroscope intubation. In our case, the same as in Xue`s report we administrated fentanyl with good effect. Choi *et al*. [3] reported awake combined Glidescope — flexible fibroscope intubation in patient with an elliptic tumor mass about 4 cm in diameter chich was blocking almost all of the top part of the glottis. They used remifentanil infusion as opioid. The number of report of combined use of videolaryngoscopes and flexible fibroscopes is limited. Other studies found in PubMed are on intubation under general anesthesia. The study of Greib *et al* was performed on patients under general anesthesia [1]. Moore *et al*. [4] described use of Glidescope and fibroscope in morbidly obese woman but also under general anesthesia

What is worth to mention, in case of Glidescope videolaryngoscope it may be necessary to introduce ET tube with stylet first nearby entrance to larynx, then remove the stylet and place flibroscope into ET tube, and then it could be proceeded into trachea [2]. In case of KingVision because of ET channel incorporated into blade the insertion of fibroscope was easer without former insertion of ET tube. It should be easer and require less mannouvers comparing to method of Xue *et al*. in which Glidescope operator had to inform bronchoscopist about position of tip of fibroscope [1].

Very interesting concept of using combination of videolaryngoscope and fiberoscope called "smart stylet" technique was presented by Weissbrod and Merati [5]. Entrance to larynx is visualized by videolaryngoscope but fiberoscope is used only as stylet with moveable tip- not for visualization of glottis.

As conclusion we assume that the use of KingVision videolaryngoscope combined with flexible fibroscope for awake intuabtion under dexmedetomidine sedation can be a good option in patients with suspected difficult intubation

and it may be easer to use and more effective comparing to other videolaryngoscopes and/or fibroscope alone.

ACKNOWLEDGEMENT

1. The authors declare no financial disclosure.
2. The authors declare no conflict of interest.

References:

1. *Greib N, Stojeba N, Dow WA, Henderson J, Diemunsch PA*: A combined rigid videolaryngoscopy-flexible fibrescopy intubation technique under general anesthesia. Can J Anaesth 2007; 54: 492–493.
2. *Xue FS, Li CW, Zhang GH, Li XY, Sun HT, Liu KP et al.*: GlideScope-assisted awake fibreoptic intubation: initial experience in 13 patients. Anaesthesia 2006; 61: 1014–1015.
3. *Choi GS, Park SI, Lee EH, Yoon SH:* Awake GlideScope® intubation in a patient with a huge and fixed supraglottic mass. A case report. Korean J Anesthesiol 2010; 59 (Suppl): S26–S29. doi: 10.4097/kjae.2010.59.S.S26.
4. *Moore MSR, Wong AB:* GlideScope® intubation assisted by fiberoptic scope. Anesthesiology 2007; 106: 885.
5. *Weissbrod PA, Merati AL*: Reducing injury during video-assisted endotracheal intubation: the „smart stylet" concept. Laryngoscope 2011; 121: 2391–2393. doi: 10.1002/lary.22167.

Corresponding author:

Prof. Tomasz Gaszyński MD, PhD
Department of Emergency Medicine and Disaster Medicine
Barlicki University Hospital
ul. Kopcińskiego 22, 90–153 Łódź, Poland
e-mail: tomasz.gaszynski@umed.lodz.pl