worth remembering that the oxygen reserve in parturients is physiologically absent (low FRC), which in cases of respiratory depression necessitates immediate intervention. Maintenance of patent airways in an obese patient additionally complicates the situation, creating a real threat to the life of both mother and her unborn child. Therefore, we agree with experts that parenteral opioids should not be used in spontaneous delivery anaesthesia as a routine [4]. In cases of potential contraindications to central blocks, inhalation agents should be considered [11].

We agree with the authors of the discussed paper as to the necessity to improve the availability and conditions of labour analgesia in Poland and that each medical centre should develop its own standards. However, having in mind the safety and comfort of parturients, we recommend performing epidural analgesia (or other central neuroaxial blocks) as widely as possible, as it remains the gold standard of management.

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In reply to the commentary to Commentary to "Remifentanil for labour pain relief"

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In response to the letter of Radosław Chutkowski *et al.*, I would like to thank them for their opinion in the discussion. The remarks and doubts of Dr Chutkowski regard a number of issues I would like to address.

Although I do agree that pethidine should be consigned to history, this is not yet the case, a fact which is evidenced by national and international reports of its common use, despite its negative reputation in numerous medical facilities [1]. I also agree that "remifentanil seemed a good alternative..." in comparison to other opioids used parenterally in labour analgesia; even more, I believe it is still such an alternative, a view that is also shared by the authors of the publications quoted by Dr Chutkowski.

Based on the publications of Tveit and Freeman, Chutkowski claims that using remifentanil may lead to sedation and respiratory depression. However, detailed analysis of Trevit's report [2] gives us important information that has escaped Dr Chutkowski's notice. Trevit discontinued the PCA infusion and used O_2 supplementation when the concentration of SaO_2 dropped below 92% or when the respiratory rate was less than 9 min^{-1}. Subsequently, after the normalization of parameters,

he reassumed PCA with a smaller bolus dose (a step dose). In the conclusions of the abstract, Tveit also wrote that remifentanil administered intravenously in PCA ensures proper labour analgesia and the high satisfaction of a parturient during the first and the second period of labour. Although, sedation and respiratory depression may occur, there is no evidence of significant side effects it could have on a newborn. It goes without saying that careful monitoring of a parturient is mandatory.

Special attention should also be paid to the other report quoted, namely the paper by Freeman *et al.* [3]. This presents the results of a multicenter study carried out in Holland on a group of parturients with 447 of them administered remifentanil in PCA and 347 undergoing central epidural analgesia. It has escaped doctor Chutkowski's notice that desaturation, although concerning a smaller yet relevant percentage, i.e. 5%, also appeared in the central epidural analgesia group. This means that regardless of the method applied, oxygen supplementation may be required. Furthermore, some other complications developed in the central epidural analgesia group, which were not found in the group with remifentanil alone; these included hypotension and post-puncture headaches. It is worth stressing that pulse oximeter readings suggesting desaturation may not be connected with the type of analgesia used and may be caused by the clenching of hands. While placing the sensor in another location could help to settle this dilemma, as results from the publication by Stocki show, parturients do not accept such solutions [4].

Dr Chutkowski writes as follows: "In recent years even more alarming reports have been published. They concern cases of severe respiratory depression, or even respiratory arrest, in parturients administered intravenous remifentanil", basing this on the publications of Bonner and Pruefer [5, 6]. Meanwhile, the quoted authors themselves admit that these complications were caused by basic human error. Bonner states that it is not certain whether remifentanil is indeed the only causative factor. In the case discussed, a 17-year-old patient of unknown body weight during a pregnancy ending with stillbirth, received remifentanil in a high dose of 40 mcg/bolus with a 2-minute refractory period. In total, during 5 hours she was given 4mg, which is a high dose. Moreover, other factors appeared, such as the patient's exhaustion, vomiting, dehydration and reduced nursing supervision since there was no need to monitor the fetal vital signs. When the family reported that the patient had lost consciousness, oxygen ventilation was applied immediately and consciousness and independent ventilation were restored after approximately 40 seconds.

The other author — Pruefer — in his report did not exclude the possible overlapping of effects of fentanyl, administered earlier epidurally, with the cumulative action of several bolus doses of remifentanil. Such a mistake might have appeared due to the attachment of a PCA infusion to the cannula with other infusions and its temporal obstruction**.** When apnoea was noticed, the patient was turned to the left lateral decubitus position and an oxygen ventilator was used. Subsequently, apnoea subsided within 30-60 seconds. After this incident, PCA remifentanil was decided upon through a separate vascular access dedicated only to this infusion. Both authors unanimously stress the necessity of monitoring the parturient by a mid-wife in a 1:1 ratio, and do not negate the further use of remifentanil on their wards.

Moreover, Dr Chutkowski claims that analgesia with remifentanil causes discomfort to patients. In my opinion, some publications cited by the doctor contradict this. Indeed, Tveit states that 88% of his patrurients would chose the same analgesia again, i.e. the administration of remifentanil. In a paper by Stocki, published in 2014, concerning a randomized study comparing remifentanil and central epidural analgesia in parturients, we read that remifentanil PCA, despite worse analgesic effects, provides patients with better comfort than central epidural analgesia. Interestingly, in this study, patients randomized to the central epidural analgesia group were not pleased with the choice, which indicates the popularity of analgesia with remifentanil, despite its undeniably poorer efficacy. Although, I do agree with my colleague that using remifentanil excludes "walking analgesia", parturients with central epidural analgesia and an additional oxytocin infusion which the doctor mentions, will also have difficulty walking.

Citing a paper by Kim [7], Chutkowski states: "Thirdly, what should also be taken into account are the reports concerning the high hyperanalgesic potential of remifentanil, demonstrated in animal tests"; most likely, he was thinking of hyperalgesia. I would like to point out that, despite what the doctor claims, this study was not limited to animals and included humans as well. While Hyperalgesia caused by remifentanil discussed in the paper is known, in this particular case it concerned high doses used during a perioperative period and over a longer period of time. The phenomenon was not observed with doses used in labour analgesia.

Although he title of Van der Velde's paper cited "Patient-controlled intravenous analgesia remifentanil for labour analgesia: time to stop, think and reconsider" [8] sounds serious, the safety issues it concerns are also essential elements of our specialization. Kranke, the other of the quoted "opponents" of remifentanil poses this question in the title of his paper: "Must we press on until a young mother dies?" [9]. After thorough investigation of the abovementioned reports, it is clear to see that their authors warn against the introduction of the method in question as a first-choice method, justified *inter alia* by a possible reduction in analgesia costs. They both agree that in such situations thinking about cost-effectiveness may have catastrophic results and that under no circumstances can we give up direct nursing supervision over the patient in a 1:1 ratio. However, it

should also be emphasised that they both claim that PCA remifentanil can be a real alternative to other methods of labour analgesia. Indeed, I have presented the same view on safety in my own paper.

In analysing the possibilities of labour analgesia in Poland, the author discusses the experiences of his own team. In technically difficult situations involving central epidural analgesia, he suggests ultrasonographic identification of anatomic structures. Although this is a very good solution, unfortunately ultrasonography is not widely available and not all medical facilities have an anaesthetic team with a lot of experience in this method. Therefore, focusing on the availability of labour analgesia in Poland, all obstetric departments and the real chances of the safe performance of procedures should be considered. Thus, the methods mastered only by referral centres should not be recommended for widespread use.

The other central blocks mentioned by the author (CSA, CSE) sometimes cannot be used due to medical contraindications or the lack of the patient's consent. Moreover, it should be stressed that CSA is not a commonly used method. The data concerning its induction is still too scarce for this method to be recommended as the standard one. Therefore, I believe that epidural analgesia, CSE and CSA are not methods that can be used interchangeably.

While discussing their unquestionable achievements, the authors neglected the possible adverse events that can develop during central blockades. Although rare, they cannot be disregarded. Post-puncture headaches are most commonly observed. If they develop, the patient is immobilized, which considerably limits her possibility of breastfeeding on request — and this, in turn, may disrupt the emotional bond between mother and child, a problem that the authors also mention.

Moreover, the authors quote Kranke, who thinks that although central epidural analgesia is the gold standard in labour analgesia, also notices the severe adverse effects that may accompany this method, such as improper catheter placement (intravascularly, subarachnoidally). As the author mentions, instant intervention to ensure ventilation is needed in such cases, and, similarly, in cases of hypoventilation caused by remifentanil. The major difference is that in the case of remifentanil, hypoventilation usually subsides after several dozen seconds, whereas complications of regional analgesia – respiratory depression and circulatory disorders – generally last slightly longer [10]. Such situations are not even mentioned by the author.

Furthermore, I do not agree with the opinion that the use of inhalation anaesthetics as an alternative to central epidural analgesia is justified, except for situations when no other option is available. However, I do agree with the authors cited by Dr Chutkowski concerning the poor analgesic effects of these agents and their unknown influence on the child's developing brain [9].

To conclude, I agree with part of conclusions presented by Dr Chukowski namely, that epidural analgesia remains the gold standard in labour analgesia. However, I believe that remifentanil PCA should be accepted as an alternative standard much as it is used worldwide, which is unanimously confirmed by all the authors cited by my colleague.

Summing up, I would like to finish this discussion with the following important conclusions:

1. Remifentanil PCA can be a valuable alternative to central epidural analgesia when the latter is difficult to apply or infeasible
2. The use of remifentanil PCA requires direct continuous nursing supervision over the parturient in a 1:1 ratio and the possible periodic use of oxygen, if necessary
3. Rules for the use of remifentanil PCA, in the form of recommendations, should be developed by the appropriate Polish scientific societies.

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