Editorial

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Limited advantage of sugammadex reversal over the traditional neuromuscular reversal technique in terms of postoperative recovery of bowel function

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Sugammadex provides rapid and reliable neuromuscular reversal from any depth of block, and its clinical use is increasing. Although evidence is limited to conclude that the routine use of sugammadex contributes to overall cost reduction, little doubt exists regarding the superiority of sugammadex over neostigmine or pyridostigmine.

Sugammadex, a modified γ -cyclodextrin, acts by forming very tight water-soluble complexes at a ratio of 1 : 1 with steroidal neuromuscular blocking drugs (rocuronium > vecuronium > pancuronium). Both sugammadex and the sugammadex– rocuronium complex are chemically inert and therefore have no direct effects on the cholinergic receptors. However, traditional reversal technique for neuromuscular blocks using an admixture of anticholinesterase and anticholinergic drugs can pose undesirable gastrointestinal effects, depending on the used drug and dose ratio.

In the April 2020 issue of the *Korean Journal of Anesthesiology*, An et al. [1] compared postoperative gastrointestinal motility between sugammadex and the combination of pyridostigmine and glycopyrrolate in patients undergoing laparoscopic cholecystectomy. This randomized controlled study revealed that the use of sugammadex as a reversal agent for neuromuscular blocks resulted in an earlier first postoperative passage of flatus compared to the use of the mixture of pyridostigmine and glycopyrrolate. Previous 2 trials on neuromuscular block reversal showed conflicting results [2,3]. In a retrospective study by Deljou et al. [2], sugammadex reversal resulted in an earlier first postoperative bowel movement in patients who underwent intraperitoneal surgery compared to reversal with neostigmine or glycopyrrolate. In contrast, a randomized controlled trial by Sen et al. [3] revealed no statistical differences in the time to first flatus or bowel movement following thyroid surgery between reversal with sugammadex and that with neostigmine or atropine.

These conflicting results may be mainly attributed to multifactorial origins of postoperative ileus. Acetylcholine allows an increase in gastrointestinal motility as the principal excitatory neurotransmitter in the gastrointestinal tract. Therefore, drug-induced cholinergic stimulation or inhibition can cause a change in gastrointestinal motility. However, because postoperative ileus is caused by complex neuro-immuno-inflammatory responses, the cholinergic pathway is one of the causative mechanisms [4]. The surgical inflammatory response and μ -opioid receptor activation are clinically more relevant pathways of postoperative ileus. Thus, reduced surgical incision or intestinal manipulation and opioid-sparing multimodal postoperative analgesia are more effective than neuromuscular reversal. In the study by An et al. [1], the magnitude of difference in the time to first flatus

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was small between the reversal with sugammadex and that with pyridostigmine or glycopyrrolate (approximately 5 h). Although it reached statistical significance, such a small difference could only have limited clinical significance.

Conflicting results among studies may also be related to the combination of different anticholinesterases (neostigmine or pyridostigmine) or anticholinergics (atropine or glycopyrrolate) and their dose regimens. Dominance of the promotility or antipromotility effect on the gastrointestinal tract and its duration depends on the reversal drugs and their dose regimen. Compared to atropine, glycopyrrolate has a longer duration of action (2–4 h vs. 30–60 min). In addition, the effects of glycopyrrolate on delayed gastric emptying are greater than those of atropine [5]. Contrary to the 2 favorable studies on reversal with sugammadex [1,2], atropine was administered along with neostigmine for neuromuscular block reversal in the study by Sen et al. [3], revealing no association between the neuromuscular reversal technique and the recovery time for postoperative bowel function.

Postoperative ileus is the most common postoperative complication that delays hospital discharge, increases costs, and contributes to adverse outcomes. Various neural and chemical factors are involved in the development of postoperative ileus. In addition, considering the relatively short durations of actions of anticholinesterase and anticholinergics, the neuromuscular reversal technique may have a limited (if present) impact on the postoperative recovery of bowel function. Therefore, further studies in diverse surgical settings are required for incorporating the use of sugammadex as an element of the enhanced recovery after surgery program.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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