

# Determination of the effects of chronic steroid usage on sugammadex reversal by evaluating biophysical parameters

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**Background:** Sugammadex is a novel developed reversal agent which encapsulates non-depolarizing steroidal muscle relaxants (e.g. rocuronium) and removes their neuromuscular blocking effects rapidly and effectively. Previously in vitro study showed that dexamethasone (Dex), a steroid, reduced sugammadex-rocuronium efficiency dose-dependently since sugammadex interacts with steroidal structures. However, there was no available data about the effects of long-term steroid usage on sugammadex reversal. The aim of the present study was to determine whether chronic usage of steroids (Dex and Prednisolone (Pred)) affect the sugammadex reversal efficiency on rocuronium induced neuromuscular blockade by evaluating contraction parameters of diaphragm muscle.

**Methods:** Animals (rats) were divided into three groups and injected daily intraperitoneally with; I- Saline (600 µg/kg or 10 mg/kg; as control) II-Dex (600 µg/kg), III-Pred (10 mg/kg) during 14 days. After the completion of injections, rats were decapitalized. Isolated phrenic nerve-hemidiaphragm muscles were mounted by silver electrodes to an organ bath containing Krebs solution. After preparations were allowed to stabilize for 60 min, isometric twitch tensions were measured for muscles and nerves at 1 Hz, for 0.2 ms and 0.05 ms stimulations, respectively. Measurements were repeated with addition of rocuronium (10 µmol/L) and sugammadex (30 µmol/L) to solution.

**Results:** Rocuronium-induced depressed twitch tensions were recovered by sugammadex, with % 81,5 and % 89,8 efficiency in chronic dex and pred group, respectively. When nerve was stimulated, efficacy of sugammadex reversal were obtained as % 96,9 and % 88,9 for dex and pred group, respectively (p<0,05).

**Conclusion:** Our results demonstrated that chronic usage of steroids does not significantly affect the efficacy of sugammadex reversal and may be considered as a negligible factor in effectiveness of sugammadex-rocuronium interaction.