

Is ketamine–propofol mixture (ketofol) an appropriate alternative induction agent for electroconvulsive therapy?

Sir,

Electroconvulsive therapy (ECT) remains a widely used effective and safe treatment for a variety of complicated psychiatric conditions including severe and medication resistant depression and mania, as well as in the treatment of schizophrenic patients with affective disorders, suicidal drive, delusional symptoms, vegetative dysregulation, inanition and catatonic symptoms.^[1-3] Almost all ECT procedures are carried out under general anesthesia with muscle paralysis.^[4] Now the number of ECT procedures performed annually under general anesthesia in the United States exceeds the number of appendectomy, coronary revascularization and herniorrhaphy procedures.^[3] The objective of anesthesia during ECT is to provide a rapid onset and balance of both unconsciousness and muscle relaxation for the duration of the electrical stimulus and subsequent seizure, while minimizing the aforementioned physiological and physical effects.^[2] Therefore, anesthetics that are used for general anesthesia during ECT should have rapid onset, rapid emergence, not interfering with seizure activity and longer seizure duration.^[5] Several anesthetic agents such as methohexital, etomidate, ketamine, enflurane, thiopental and propofol are used for this purpose, but the ideal anesthetic agent for ECT procedures remains unclear.^[2-3,5-8] Propofol is widely used in ECT anesthesia as a reference agent due to characteristics such as rapid onset and emergence from anesthesia, minimal postoperative confusion and a lower incidence of hypertension or tachycardia during induction of anesthesia. However, it produces a dose-dependent decrease in seizure duration.^[5] Ketamine, which is an N-methyl-d-aspartate (NMDA) receptor antagonist, is also a noteworthy anesthetic agent in ECT that has a lesser anticonvulsant effect, favorable seizure induction action and increased seizure duration.^[9,4] Also an increasing number of studies suggest that ketamine provides an earlier recovery after ECT, and has the potential to reduce retrograde amnesia and accelerate the clinical response to ECT due to its antidepressive action.^[10-12] Its main disadvantages are that it produces hypertension, delayed recovery and precipitates psychomimetic emergence phenomena.^[13] The opposing effects of ketamine and propofol on the hemodynamic and respiratory systems are well known;

therefore their side-effects on these systems could be reduced by administering a combination of them at a lower dose.^[9] In recent studies done on patients undergoing ECT, it showed that using sub-anesthetic ketamine and low-dose propofol could increase the seizure duration, provide hemodynamic stability and earlier recovery compared with the use of a full dose of propofol alone. In a study by Wang *et al.* with aim to evaluate the effects of combined anesthesia (propofol and ketamine) for patients with depressive disorder undergoing ECT, it showed that decreases in depression scores were significantly greater in ketamine and propofol plus ketamine groups compared with those in propofol group. Also the adverse effects in propofol plus ketamine group were fewer than those in ketamine group. This suggests that propofol combined with ketamine anesthesia might be the first-choice anesthesia in patients with depressive disorder undergoing ECT.^[14] In another study by Yalcin *et al.* with aim to evaluate the effect of ketamine, propofol and ketofol (combination of ketamine and propofol) on hemodynamic profile, duration of seizure activity and recovery times in patients undergoing ECT have been shown that ketofol 1: 1 mixture is associated with longer mean seizure time than propofol and shorter mean recovery times than ketamine, with better hemodynamic stability, without any important side effects in ECT anesthesia.^[4]

Also a study by Erdogan Kayhan *et al.* have shown that ketamine–propofol combination (ketofol) can be an alternative strategy to enhance the seizure quality and clinical efficiency of electroconvulsive therapy.^[9]

In summary, considering the results of recent studies, it seems that ketamine–propofol mixture (ketofol) can be used as an appropriate alternative induction agent of choice for electroconvulsive therapy. We believe that further clinical trials in this regard are warranted to assess the efficacy of this mixture as a good alternative anesthetic agent for ECT procedures.

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