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Research Article

Use of remifentanil in comparison with sodium nitroprusside for controlled hypotension during rhinoplasty: Randomized controlled trail

Eman Mohammed Kamal Aboseif *, Sameh Mohammed Osman

Anesthesia and ICU Department, Faculty of Medicine, Ain Shams University, Egypt

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KEYWORDS

Remifentanil;
Sodium nitroprusside;
Controlled hypotension;
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Abstract *Objective:* To evaluate the clinical efficacy of remifentanil infusion in comparison with sodium nitroprusside regarding controlled hypotension during rhinoplasty.
Background: Controlled hypotension is a well-known technique used in many operations to reduce blood loss and need for blood transfusion and to provide satisfactory bloodless surgical field. Many pharmacological agents are used to perform controlled hypotension intraoperatively.
Patients and methods: A total of 130 adult consented patients of both sexes undergoing rhinoplasty aged 20–45 years with ASA I or II, were randomized to receive remifentanil infusion 0.25–0.5 μg/kg/min (group I = 65 patients) or sodium nitroprusside 0.5 μ/kg/min intraoperatively with adjusting dose till reaching target MAP around 80 mmHg. Anesthetic technique was standard for both groups. Time to onset of induced hypotension and time to target MAP were recorded in addition to heart rate during induced hypotension, PaO_2, PCO_2 and PH together with the total infusion dose of the hypotensive agents in both groups.
Results: Remifentanil infusion intraoperatively induces adequate hypotension with no statistical significant difference to that induced by sodium nitroprusside ($P < 0.05$).
Conclusion: This study confirmed that remifentanil infusion with dose of 0.25–0.5 μg/kg/min. induced desired controlled hypotension intraoperatively during rhinoplasty with no complications occurred either intra- or postoperative with advantage of rapid recovery from anesthesia.

1. Introduction

Controlled hypotension has been used to reduce bleeding and the need for blood transfusion, and also to provide a satisfactory bloodless surgical field in many operations as in oromaxillofacial surgery, endoscopic sinus surgery, rhinoplasty, middle ear surgery, major orthopedic surgery (as hip or knee

* Corresponding author at: Anesthesia and ICU Department, Faculty of Medicine, Ain Shams University, Lotfy Alsaid Street Abassia, Cairo, Egypt. Tel.: +20 1022604863.
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replacement, spinal) cardiovascular, neurosurgery and liver transplant surgery [1].

Controlled hypotension is defined as a reduction of the systolic blood pressure to 80–90 mmHg, a reduction of mean arterial pressure (MAP) to 50–65 mmHg or a 30% reduction of baseline MAP [2]. Many pharmacological agents used for controlled hypotension include those that can be used successfully alone or in combination with others to limit dosage requirements and the adverse effects of each agent [3]. The common agents that had been used are inhalational anesthetics, sodium nitroprusside, nitroglycerin, adenosine, prostaglandin E, beta blockers (especially esmolol), calcium channel blockers and nacrcotics (especially remifentanil [4] (see Figs. 1–6).

Other agents may be used mainly as adjunctive as ACE inhibitors and α_2 agonists (e.g. clonidine) [5]. The main goal of any hypotensive drug is to achieve the desired level of controlled hypotension without affecting the perfusion of vital organs and should have a rapid onset, which is easy to be administered and disappears quickly when administration is discontinued without toxic metabolites [6]. The new ultrashort acting μ-opioid receptor agonist (Remifentanil) hydrochloride is known to have a hypotensive effect during a propofol total intravenous anesthesia = TIVA, and this is used effectively for controlled hypotension and providing a clear dry surgical field [7].

Sodium nitroprusside is a well-known direct vasodilator (acting on both arterioles and venules) commonly used to induce controlled hypotension with its high potency and short duration of action but it has many side effects and disadvantages making it is not suitable for many patients. Rebound hypertension and increased potentials for cyanide toxicity, and tachyarrhythmia are the common side effects [8].

The purpose of this study was to evaluate the effectiveness of remifentanil to induce controlled hypotension as primary

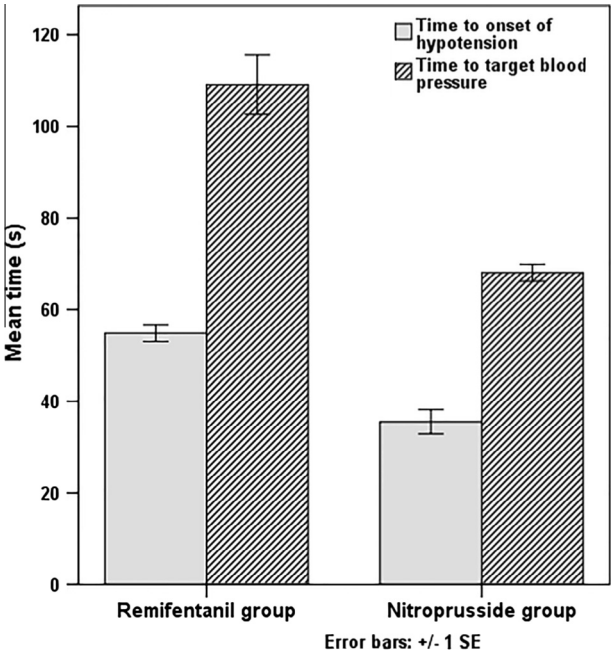

Figure 1 Mean time to onset of induced hypotension and time to target blood pressure in both study groups.

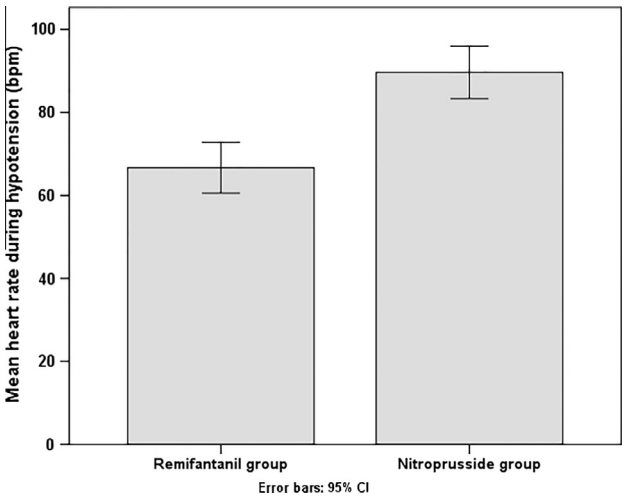

Figure 2 Mean heart rate during induced hypotension in both study groups.

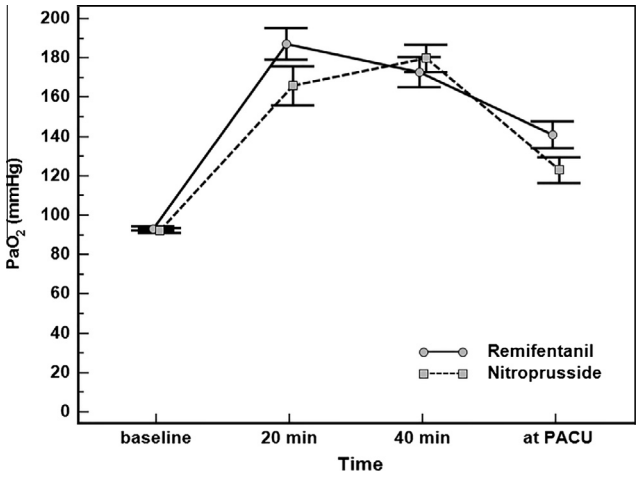

Figure 3 Change in PaO_2 in both study groups. Error bars represent 95% CI.

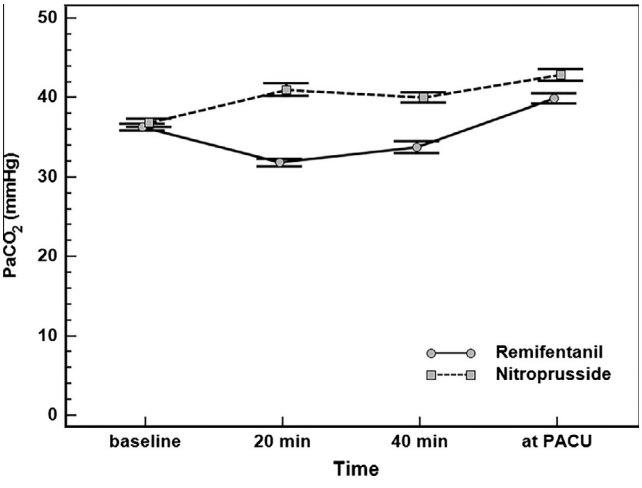

Figure 4 Change in $PaCO_2$ in both study groups. Error bars represent 95% CI.