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COMBINATION OF PROPOFOL/REMIFENTANIL VS SEVOFLURANE/REMIFENTANIL FOR MAINTENANCE OF ANAESTHESIA FOR INTRACRANIAL SURGERY COMPARATIVE STUDY

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Abstract:

Background.
Propofol and sevoflurane are suitable agents for maintaining anesthesia during neurosurgical procedures. We prospectively compared these agents in combination with remifentanil, a short-acting opioid.

Methods.
Fifty patients undergoing elective craniotomy received remifentanil 1 micg kg1 followed by an infusion of 0.5 micg kg1 min1 reduced to 0.25 micg kg1 min1 after craniotomy. Anesthesia was induced with propofol and maintained with a controlled infusion of propofol, minimum target dose of 2 micg ml1, or sevoflurane initially2% $_{ET}$ .Mean arterial pressure (MAP) episodes above 100 mmHg or below 60 mmHg for events lasting longer than 1 minute were defined as hypertensive or hypotensive events. Surgical Assessment of the operating conditions and spontaneous breathing time, extubation, obey commands and eye openings in comparison to recorded. The acquisition cost of the drug was calculated.

Results.
Twenty-four and twenty-six patients were assigned to propofol (group P) and sevoflurane (group S), respectively. The number of hypertensive events was comparable, while more hypotensive events were observed in group S than in group P (P = 0.053, chi-sq. process). As reliever therapy plus labetalol [45 (33) vs 76 (58) mg, P=0.073] and ephedrine a[4,80 (2,21) vs. 9,78 (5,59) mg, p=0.020] were used in group S.
Differences between groups recovery times were short and clinically insignificant. Total hourly acquisition cost hypnotics, analgesics, and vasoactive drugs appeared to be fewer in treated patients sevoflurane versus propofol.

Application.
Propofol/remifentanil and sevoflurane/remifentanil were satisfactory Anesthesia for Intracranial Surgery.

Keywords: Intravenous anesthetics, propofol; volatile anesthetics, sevoflurane; Surgery, neurosurgery, craniotomy

INTRODUCTION:

intravenous and inhalation injections are common Maintenance of Anesthesia in Neurosurgical Procedures Comparison of I.V. and inhalation techniques were ambiguous and use of both techniques was currently considered "Best Practice [1-4] remifentanil a has a rapid onset of action and is eliminated quickly when The infusion was stopped. [5, 6] These qualities combined with little postoperative pain, make it logical possibilities for neurosurgical anesthetic procedures. However, There are no published reports comparing

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sevoflurane/Anesthesia with remifentanil and propofol/remifentanil in neurosurgery

METHODS

Fifty patients undergoing elective craniotomy in Imam sadiq teaching hospital and AL zahraa teaching hospital / Alnajaf alashraf were included in this study. We have thought carefully Use of a double-blind study in this study, but declined this in the form of intralipid placebo injections with the necessary "label" to support the targeted infusion system are not available. You can easily recognize sevoflurane by smell this also made glare difficult. anesthetics choice in practice were easily hidden by the operation surgeons and nurses in the recovery room. Artery pressures were recorded by direct measurement from the radial artery and stored at 1 minute intervals . Episodes of "Hypertension" and "Hypotonia" were determined based on access to the stored electronic record Monitor. That's why we thought it was appropriate degree of blindness and satisfactory objective There were diagnoses of hemodynamic instability.

ANESTHESIA:

After establishing standard monitoring, all patients received a bolus remifentanil 1 micg kg1 followed by an infusion0.5 micg kg1 min1 then decrease to 0.25 micg kg1 min1 as the surgeon start operation. The patients were interviewed after the start how the medicine worked and when they got dizzy or sleep anesthesia was induced with propofol. in sick people were randomized to receive propofol anesthesia (Group P)were stunned by controlled IV propofol initial target plasma concentration, 1 micg ml1, then gradually increased until satisfactory anesthesia was reached. Anesthesia was maintained by controlled infusion of propofol with minimal target strength 2micg\ ml. In patients randomized to sevoflurane (Group S) Anesthesia was induced by bolus injection Propofol, 0.5 mg $kg^{-1}$with 10 mg booster doses every 10 seconds till unconsciousness achieved . The anesthesia were t maintained on sevoflurane, initial end-tidal concentration 2%, then lowest concentration was 1%. Endotracheal intubation was performed by administration of a bolus of atracurium i.v followed by infusion until the dura sutured. All patients were with normocapnia artificially ventilated with circular breathing system and oxygen 0.5l\min and 1.0 l/min air during anesthesia. Finally, the remaining neuromuscular blockade was reversed with 2.5 mg neostigmine and 0.5 mg atropine. Remifentanil infusion was stopped once the wound sutured, while sevoflurane and propofol maintained until dressing finished. Between the induction of anesthesia and the craniotomy, mannitol was administered at a dose of 1 g/ kg . Additional mannitol was given when clinically indicated. Surgeons regarded less the anesthetic technique the state of the brain was assessed as 'fixed', 'fair' or 'flexible'. Then the dose of mannitol was recorded.

Hypertensive episodes defined as mean arterial pressure(MAP) more than 100 mmHg for more than 1 min treated with remifentanil 1 micg /kg and infusion rate increased by 0.125 micg /kg/ min. If the MAP elevated, this regimen repeated 2 minutes later. If the patient still hemodynamically unstable after the next 2 minutes than the propofol target or sevoflurane concentrations were increased. Labetalol or hydralazine were administered according to clinical need.

Episodes of hypotension defined as MAP below 60 mmHg for more than one minute that did not respond to a fluid bolus were treated by reducing target levels of propofol or sevoflurane concentrations. A vasopressor was given as needed. There were episodes of hypertension and hypotension. Blood pressure was measured manually and before anesthesia, then continuously with an arterial cannula. times for adequate breathing, extubation, eye opening and obedience to orders was recorded .Analgesia inside the recovery area was maintained with morphine 2 mg administered at 5 minute intervals according to hospital standard Protocol. Nausea and Vomiting and Discharge from theater are documented by medical staff.

STATISTICAL ANALYSIS

Data tabulation, input and coding was done using the SPSS (Statistical Package for the Social Sciences) program version 26.

Comparison continuous variables were created by Mann-Whitney Test U. Categorical values were analyzed using the chi-square test. A P-value of 0.05 was considered statistically significant.

RESULTS

50 patients were recruited for the study. Twenty four were assigned to propofol anesthesia (group P) and 26 for sevoflurane anesthesia (group S). One patient in Group S required nocturnal ventilation for surgical reasons. We included intraoperative data but not recovery data for this patient patients.

The demographic characteristics data of the patients in the both groups were well matched (Table 1).The infusion rate of propofol was 5.45 (SD 1.0) mg\ kg\h per \Group P. Group S received 1.06 (0.6) mg \kg propofol for induction and end-tidal concentration of sevoflurane with 1.13 (0.19)%. The infusion rate of remifentanil was similar two groups (Table 2). The duration of anesthesia was longer group P, but the difference was not statistically significant. brain status assessed by surgeon and The dose of mannitol was comparable in both groups (Table 2).

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Table 1 Patient characteristics. Data are presented as median and range.

Variable	Group P(no=24)	Group S(no=26)	P value
Age (yr.) 56	(34–73) 58	(31–78)	0.491
Male/female	11/13	10/16	0.598
Height (cm)	168 (155–195)	168 (160–182)	0.995
Weight (kg)	69.5 (50–152)	68 (53–92)	0.567
BMI (kg m2)	25.3 (20.0–40.0)	23.4 (19.9–32.7)	0.200
Hypertension (%)	40.0	30.4	0.518
Operation (tumor/ aneurysm/microvascular)	18/6/0	17/7/2	0.363
Location (supratentorial/ posterior fossa)	22/2	21/5	0.267

Arterial pressure before, during, and after surgery was similar in the two groups (Fig. 1). Hypertensive episodes were seen in seven in group p and eight patients in group S. These patients experienced a median of1 (range 1–7) and 1 (range 1–4) hypertensive episodes, respectively. There was no significant difference (P=0.374)(chi-square test) (Fig. 2A). Labetalol was administered to 14 patients to control hypertension [mean total dose 45 (SD 33) mg]in group P and 19 [76 (58) mg, P=0.073] in group S .Hydralazine was administered in two patient of group p and five patients in group s . These officers were mostly used to Monitor blood pressure during recovery from anesthesia.

These patients have median 2 (range 1-4) and 3 (range 1-7) hypotension episodes (Fig. 2B). It wasn't significant differences between groups (P = 0.053, chi-square test).ephedrine was administered to 63 and 88% of patients in groups P and S. The total dose of ephedrine was4.8 (2.2) mg in groups P and 9.8 (5.6) mg in group S(p=0.02)

Table 2 Surgical and anesthetic data. Data are presented as median and range. Brain condition was evaluated by the neurosurgeon subjectively.

Variables	Group p(no=24)	Group S(no=26)	P value
Brain condition (soft/adequate/tight)	4/10/9	10/6/6	0.208
Mannitol (g)	80 (0–100)	80 (35–100)	0.687
Anesthetic time (min)	200 (107–310)	164 (90–350)	0.082
Remifentanil Average dose (mg kg1 min1)	0.33 (0.17–0.63)	0.32 (0.22–0.62)	0.727
Total dose (mg)	4.21 (2.20–19.00)	3.94 (1.83–10.5)	0.321

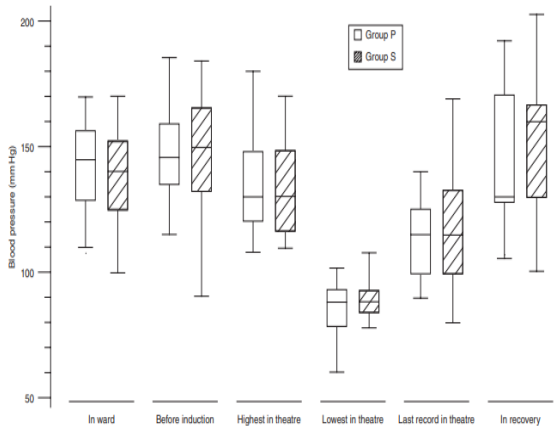

Figure 1 Systolic blood pressure is measured at each perioperative time point for propofol (group P) or sevoflurane (group S). Fine lines, girth; boxes, 25-75th percentile; thick horizontal lines; Median values There were no significant differences between the two groups (Mann-Whitney U test).

The spontaneous breathing time was significantly shorter in the P group compared to the S group (P=0.02) (Table 3). time for spontaneous breathing was 7.0 (2.0-31.0) min in groups P and 10.0(1.0–24.0) min ingroup S ,[median(range), Mann-Whitney U test].

Time to open the eyes was 7.5 (3,0–30,0) min in group p and was 12,0 (3,0–33.0) min in groups S. and the extubation time was 8.5 (3.0–40.0)min in group p and 11.0 (3.0–33.0) min in group S, respectively. The command execution time was 10.5 (3.0-40.0) min in group p and was 13.0 (4.0–48.0) min in groups S.

These differences were not statistically significant (Fig. 3).We performed a regression analysis to examine the

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relationship between recovery time and episodes of hypotension were not significantly correlated (P = 0.5280 according to Spearmann rank correlation).

Table 3 Duration, analgesia, and PONV data in recovery. Data are presented as median and range. PONV=postoperative nausea and vomiting.

Variables	Group P (n=24)	Group S (n=26)	P-value
Recovery stay (min)	85 (9–125)	94 (4–161)	0.244
Morphine given? (yes/no)	15/9	21/5	0.151
Dose (mg)	10.0 (2.0–20.0)	10.0 (4.0-18.0)	0.283
PONV (yes/no/no data)	4/18/2	4/21/1	0.950

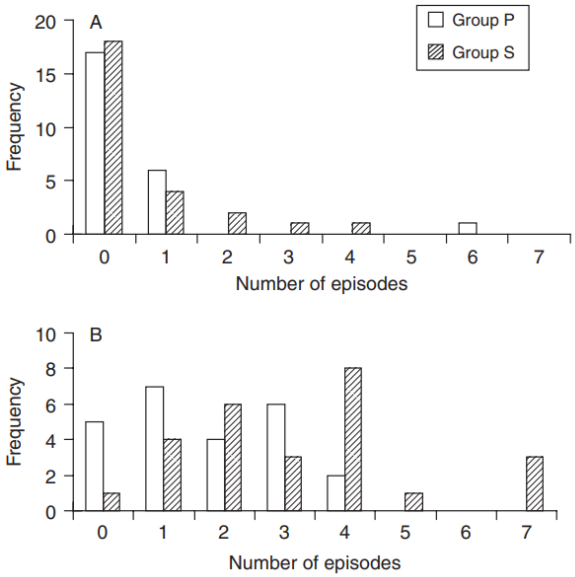

Fig 2 Frequencies of (A) hypertensive and (B) hypotensive episodes with propofol (Group P) or sevoflurane (Group S). There was no significant difference between the groups for hypertension (P=0.374, x-squared test) or hypotension (P=0.053).

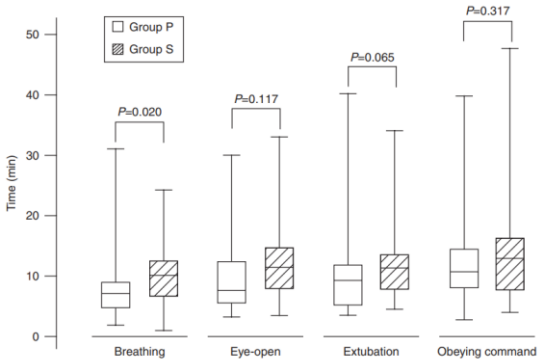

Fig 3 Times to spontaneous respiration, eye-opening, extubation, and obeying commands in patients whose anaesthesia was maintained with propofol (Group P) or sevoflurane (Group S)

DISCUSSION

We have found that sevoflurane and propofol in combination with remifentanil are satisfactory. We observed an increase in the number of hypotensive episodes in Group S, which also received the highest total dose of ephedrine as rescue treatment. A possible explanation for this is that the sevoflurane group was just lower Anesthesia. Although single doses for inhalation can easily be compared by describing them as fractions of MAC, you cannot directly compare with agent iv. Propofol CP50 for reduction of the bispectral index is 5.45mgml1,8 during Sevoflurane's IP50 value for bispectral index reduction was1.14%.9 In our study, the mean target concentration of propofol was 3.67 (0.46)mg \ml mean end-tidal sevoflurane concentration was 1.13 (0.19%). Seen against over the bispectral index data may be the group s lightly more deeply anesthetized than group P. The sevoflurane group had more cases of posterior fossa than propofol group (5 vs. 2) posterior fossa surgical poses Problems other than supratentorial surgery and hemodynamic disorders may be more common in these patients .We reviewed our data and found no excessive hemodynamic instability in patients undergoing posterior surgery. mine work sedated with sevoflurane.

We found small and clinically insignificant differences in the rebound between Group P and Group S. There are many reports comparing the induction properties of propofol and sevoflurane. Those relationships are over Sevoflurane anesthesia was faster,[10 ,11] similar,[12] or slower recovery [7 13] than with propofol anesthesia. Yli Hankala and colleagues reported no difference in recovery times between propofol/fentanyl/nitric oxide and sevoflurane/Anesthesia with fentanyl/nitric oxide under the bispectral indexcontrol. [14] We reviewed our data to assess whether episodes of hypotension, which could be the result of deeper anesthesia, were associated with delayed recovery and found that this was not the case correlations. The experiences of the

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two groups of patients whilst in the recovery area were similar, perhaps because this phase is dominated by clinical and nursing factors rather than the small differences between short-acting hypnotic agents. Many studies have reported that sevoflurane caused postoperative nausea and vomiting (PONV) more frequently than propofol anesthesia. [7 10 12] PONV occurs in about 30%of patients receiving sevoflurane. [7 10 12 15] In the present study, PONV occurred in only 15% of patients with no difference between propofol and sevoflurane.

Although there was a slight difference in drug acquisition cost between the two groups, these cost differences are very small compared to the total cost of neurosurgery and must be interpreted with caution ignore shard ware and consumable costs. We chose realistic doses of propofol and sevoflurane, who recognize its powerful synergy and remifentanil. We have already evaluated Remifentanil in monotherapy and in subsequent infusions Alfentanil in the practice of neuro anesthesiology. [15] joint clinics doses of remifentanil resulted in significant savings over sevoflurane and propofol when these agents are used for induction and maintenance of anesthesia. [17 18] In our previous study [15] propofol infusion rate (100 mg kg^{-1} min1(probably too high).

We have carefully evaluated sevoflurane and propofol as maintenance therapy with remifentanil in elective intracranial surgery. The two agents were delighted.

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