

# Comparison of midazolam and propofol during induction in elective CABG

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*Hemodynamic changes during induction of anaesthesia, with midazolam and propofol were compared in patients undergoing elective CABG.*

*Group M (Midazolam) was administered midazolam 0.2 mg/kg/IV and Group P(propofol) was administered propofol 2 mg/kg/IV. All patients were administered fentanyl 2 mg/kg/hr/IV. together with 50 % N<sub>2</sub>O, 50 % O<sub>2</sub> after induction. We measured heart rate (HR), systolic arterial pressure (SAP), diastolic arterial pressure (DAP), mean arterial pressure (MAP), central venous pressure (CVP), before induction, after midazolam or propofol, after fentanyl, postintubation and after sternotomy. In both groups, the total dose of fentanyl was similar.*

*There was no difference in these parameters between midazolam and propofol. As a result this study shows that for the induction of anaesthesia midazolam has no advantage over propofol considering the cardiac parameters. [Turk J Med Res 1994; 12(2): 66-69]*

KeyWords: Anesthesia, Midazolam, Propofol.

Midazolam is a water-soluble benzodiazepine compound that can be used for sedation and as a preanaesthetic medication and an anaesthetic adjuvant (1,2). Midazolam causes only minor haemodynamic changes in surgical patients without concomitant debilitating affections. It has been considered as being safe in cardiac disease: its nitroglycerin-like vasodilating effect is beneficial both in case of pulmonary hypertension and congestive heart failure, while cardiac output is unaffected in patients with ischaemic heart disease (3,4).

Propofol is the most recently introduced parenteral anaesthetic agent and because of this data concerning its availability for cardiac surgery are limited. The adverse hemodynamic effects of propofol when given bolus dose correlate with overshoot in blood concentration. If used appropriately propofol may have significant advantages in cardiac anaesthesia (5).

In this study, we compared the changes of cardiac parameters during induction with the midazolam and propofol.

## PATIENTS AND METHODS

The study included 24 patients of ASA grade II-III (over the EF 60 %), scheduled for CABG surgery. Patients were selected randomly to two groups: midazolam (group M) IV and propofol (group P) IV.

Group M: Anaesthesia was induced by administration of midazolam 0.2 mg/kg/IV and after 5 minutes subsequently maintained with 50 % O<sub>2</sub> and 50% N<sub>2</sub>O and fentanyl 2 ug/kg/hr/IV.

Group P: Anaesthesia was induced by administration of propofol 2 mg/kg/IV and after 5 minutes anaesthesia was maintained like group M.

In both groups one minute after the initial dose of fentanyl, vecuronium 0.1 mg/kg/IV was given. After the development of complete muscle relaxation tracheal intubation was made when required intermittent doses of vecuronium were given throughout anaesthesia based on the response of the thumb to ulnar nerve stimulation (ProMed-Easistim, Lot. No. 0.02).

Haemodynamic data were collected and evaluated at the following times before and throughout anaesthesia.

1. Preinduction: before IV midazolam and propofol administration.

2. Postmidazolam and postpropofol but pre-fentanyl: before fentanyl IV.

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Table 1. The demographic data of patients

	Midazolam	Propofol
Weight (kg)	63.3±3.7	72±2.2
Height (cm)	164.83±2.3	168.17±1.7
Age (year)	60.42±2.5	58.33±1.8
Male	10±0	12±0
Sex		
Female	2±0	0±0
Ejection Fraction	60.92±2.4	62.5±2.9
EF %		

Table 2. The cardiac data of patients

		Midazolam	Propofol
Pre	HRb/m	67.7±3.7	64.17±2.7
Induction	SAP mmHg	147.6±7.5	164.8±7.6
	DAP mmHg	73.2±3.7	77.7±3.4
	MAP mmHg	103.3±4.9	107.7±3.8
After Midazolam	HRb/m	69.6±3.9	72.5±4.2
	SAP mmHg	124.0±6.7	132.8±10
	DAP mmHg	62.8±3.4	66.2±4.4
After Propofol	HRb/m	63.0±3.3	70.58±2.6
	SAP mmHg	107.1±1.7	111.2±9.7
	DAP mmHg	58.8±3.7	59.7±5.1
After Fentanyl	MAP mmHg	76.7±4.3	75.3±6.2
	HRb/m	64.6±4.5	67.0±3.1
	SAP mmHg	129.1±9.7	123.7±6.3
Post Intubation	DAP mmHg	71.3±5.4	68.4±3.4
	MAP mmHg	80.7±3.1	86.9±4.2
	HRb/m	66.1±3.2	63.0±3.2
Post Sternotomy	SAP mmHg	121.3±8.8	115.7±4.3
	DAP mmHg	63.9±4.1	65.25±2.9
	MAP mmHg	86.4±5.9	83.3±3.4
Peroperatif	CVP mm Hg	7.1±2.1	7.2±1.8

3. Postfentanyl but preintubation: 5. minutes after fentanyl and vecuronium IV injection.

4. After sternotomy.

Cardiac parameters evaluated were

— Heart rate (HR) beats/minute

— Systolic systemic blood pressure (SAP) mmHg

— Diastolic systemic blood pressure (DAP) mmHg

— Mean systemic blood pressure (MAP) mmHg

— Central venous pressure (CVP) mmHg

The cardiac parameters were evaluated for the two groups at each sampling time during the procedure using the Student's test. Statistical significance was defined at p<0.05. There were no significant dif-

ference in all parameters between midazolam and propofol.

**RESULTS**

Intravenous injection of midazolam and propofol caused no significant changes on haemodynamic variables.

SAP changes were shown in Figure 1, DAP changes were shown in Figure 2, MAP changes were shown Figure 3, CVP changes were shown in Figure 4, HR changes were shown in Figure 5.

They were showed no statically significant changes between two groups.

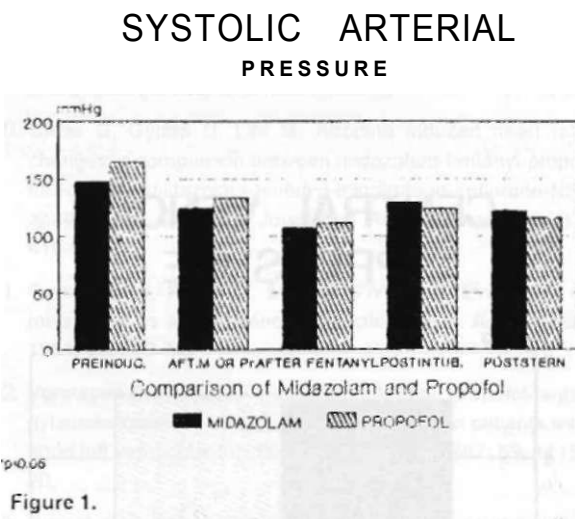


Figure 1.

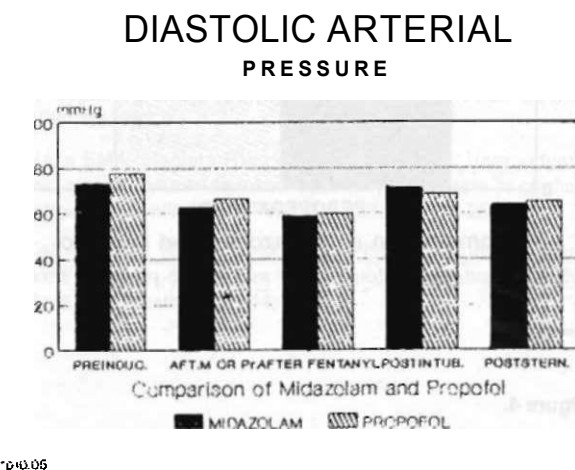


Figure 2.

**DISCUSSION**

Several intravenous induction agents including thiopentone, fentanyl, alfentanil, midazolam and propofol have

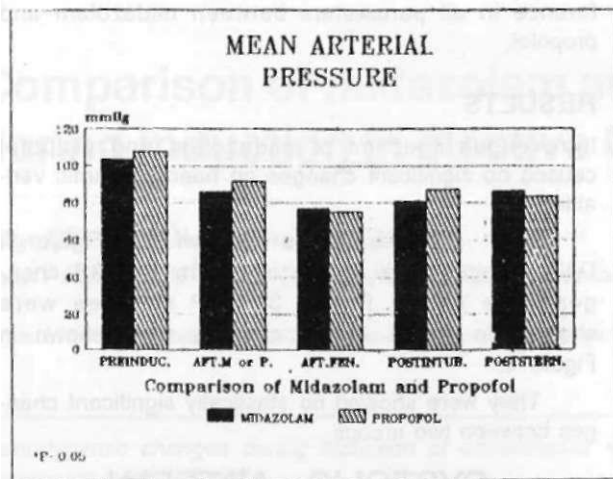
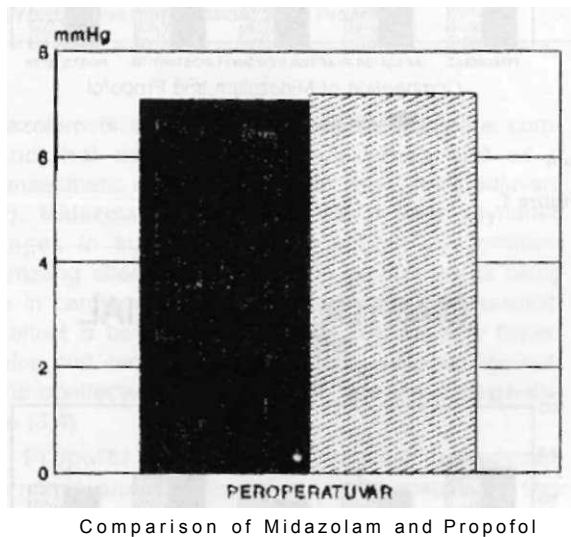


Figure 3.

## CENTRAL VENOUS PRESSURE



p-a.0a

Figure 4.

been given at induction of anaesthesia (6-10). There has been a conflict of views regarding the suitability of midazolam as an intravenous induction agent. Some authors believe that midazolam is an unreliable induction agent while others find it acceptable for induction (11).

Propofol has been very popular as an induction agent since its introduction as an emulsion preparation

(5). Propofol is the most recently introduced intravenous anaesthetic agent and data about its suitability for cardiac surgery are limited. Initial studie examined propofol as an induction agent in the presence of coronary artery disease noted a mean reduction of 28 % in systolic blood pressure related primarily to a 25 % fall in CVP (12). An alternative approach has been to avoid the use of propofol for induction of anaesthesia (13). Vermeyen et al. also noted good protection from the haemodynamic response to sternotomy using a combination of moderate dose fentanyl and propofol (12).

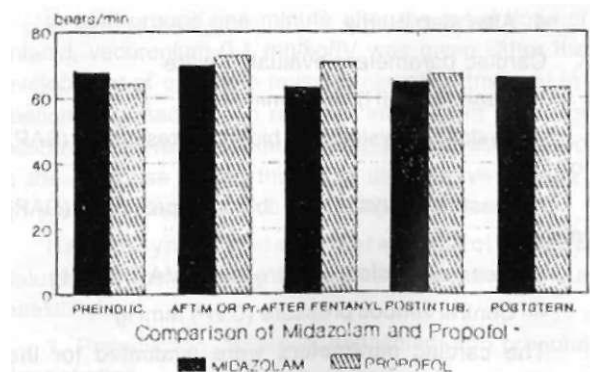
When midazolam is administered in combination with fentanyl, hypotension secondary to myocardial depression may be seen (14). This effect can be limited by slow administration and careful titration of the drug to the required end point and this has become a popular induction technique in cardiac anaesthesia (15). Further studies are required to assess the potential benefits of midazolam and the newer opioids for cardiac anaesthesia (15).

In some studies, the free plasma concentration of midazolam and propofol were compared and no statistically significant alteration were found (16).

In our study, we administered midazolam-fentanyl and propofol-fentanyl combination for induction in coronary artery surgery. Between two groups no significant changes has been found about all parameters. The safety of midazolam-fentanyl and propofol-fentanyl in anaesthetic induction for induction followed by maintenance of analgesia with fentanyl-50% N2O - 50 % O2 is also confirmed by the lack of adverse occurrences intraoperatively in these patients such as hypo or hypertension, brady-or tachycardia, arrhythmias etc. Therefore, no vasoactive drugs, inotropic agents or p-blockers were needed throughout the induction of anaesthesia for the routine nitroglycerin IV infusion.

In conclusion, midazolam-fentanyl or propofol-fentanyl induction/intubation sequence caused no adverse

## HEART RATE



\*P < 0.05

Figure 5.

haemodynamic changes in coronary artery surgery in the doses and sequence utilized in our study. We thought that midazolam-fentanyl and propofol-fentanyl combination can be used for induction of anaesthesia in coronary artery surgery. But, midazolam doesn't have any advantage when compared with propofol.

### Elektif koroner arter operasyonlarında induksiyon sırasında midazolam ve propofol kullanımının karşılaştırılması

*Çalışmamızda, elektif CABG geçiren hastalarda, midazolam veya propofol ile yapılan anestezi induksiyonu sırasında oluşan hemodinamik değişiklikler karşılaştırıldı.*

*Grup M (midazolam)'daki hastalara induksiyon sırasında 0.2 mg/kg/iv midazolam, Grup P(propofol)'daki hastalara ise 2 mg/kg/iv propofol uygulandı. Bütün hastalara anestezi idamesinde, 2 mg/kg/saat/iv hızda fentanil infüzyonu ve %50 N2O, %50 O2 kullanıldı. Kalp atım hızı, sistolik, diastolik, ortalama arter basınçları, santral venöz basınç değişiklikleri;*

*1- induksiyon öncesi 2- midazolam veya propofol veriliminden sonra 3-fentanil sonrası 4-intübasyon sonrası 5- sternotomi sonrası takip edildi. Her iki grupta da ölçülen parametrelerden elde edilen sonuçlar arasında istatistiksel olarak anlamlı bir fark saptanamadı ( $p>0.05$ ). Bu çalışmanın sonucunda, CABG sırasında, anestezi induksiyonunda, midazolamın propofole oranla bir üstünlüğü olmadığı kanısına varılabilir. [Turk J Med Res 1994; 12(2): 66-69]*

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