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"COMPARISON OF GENERAL ANESTHESIA AND GENERAL ANESTHESIA PLUS THORACIC EPIDURAL ANESTHESIA FOR PATINETS UNDERGOING OFF PUMP CORONARY ARTERY BYPASS GRAFT SURGERY(OPCABG): A PROSPECTIVE RANDOMISED STUDY"

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ABSTRACT 56 patients undergoing OPCABG surgery were randomly divided in to two groups.Study group received general anesthesia plus thoracic epidural anesthesia(GA+TEA) and control group received general anesthesia(GA) .Hemodynamic parameters, requirement of opioids,vasodilators and inotrops were compared between two groups.Total fluid balance and myocardial injury markers (Trop T and CK-MB) were assessed.Postoperative recovery and incidence of compications were also compared among both the groups.We found that mean arterial pressure and requirement of opioids, vasodiltaors and inotropes decreased significantly in GA+TEA group.Total fluid balance was significantly less in GA+TEA group. Number of Troponin T positive and CK-MB levels significantly increased in GA group at 9hr.Postoperative recovery was earlier and complications were less in GA+TEA group.Based on our data GA+TEA for OPCABG surgery appears to be most comprehensive anesthetic technique

KEYWORDS : Analgesics-opioid,Anesthesia-Epidural,Arterial Pressure,Troponin T.

INTRODUCTION

Thoracic Epidural Anaesthesia(TEA) as an adjuvant to general anesthesia (GA)and postoperative analgesic regimen, is receiving increasing attention from anesthetist and cardiac surgeons both as it combines the advantages of the two techniques while minimizing their drawbacks. Central neuraxial blockade attenuate adverse physiologic stress response associated with cardiothoracic surgery and improve myocardial metabolism(1). In present study, we hypothesize that TEA may provide better hemodynamic stability and decreases requirement of intra-operative opioids, inotropes and vasodilators. Thus the aim of study was to find out an effective method of anesthesia for OPCAB surgery.

MATERIAL AND METHOD

After approval from ethical committee and, between December 2015 and March 2016, 56 patients of either sex aged between 40-60 years,were randomly assigned intoGA and GA+TEA group for elective OPCAB surgery.Written informed consent was taken from patients.

Patient's selection criteria include triple vessel disease, EF>35%. Exclusion criteria were patient refusal, patients on oral anticoagulation, hypersensitivity towards drugs to be used and any contraindication for thoracic epidural anesthesia, preoperative insertion of an intra-aortic balloon pump,coexisting valvular disease, neurologic disorder and heart failure.

ANESTHETIC TECHNIQUE AND MONITORING

In GA+TEA group,one day before surgery thoracic epidural catheter was inserted at the T2-3orT3-4 intervertebral space in left lateral decubitus position with 18 G tuohy needle.3 to 4 cm of the catheter was inserted into the epidural space with tip directed cranially. Next day on arrival in OT,all patients received premedication with i.m Morphine0.1mg/kg and i.m Promethazine0.5mg/kg,45min prior to induction of anesthesia.Routine hemodynamic monitoring with pulse oximeter,ECG,invasive blood pressure,CVP monitoring and BIS monitoring started.

In GA+TEA group neuraxial block was established from T1-T10 with an initial bolus of 10ml,0.5%ropivacaine along with 50µg fentanyl followed by infusion of 0.2%ropivacaine with 2µg/ml fentanyl at the rate of 8-10 ml/hr and at 6-10ml/hr in ICU upto48hr.

In both the groups intravenous general anesthesia was induced with inj.Midazolam 0.05mg/kg,inj.Fentanyl5µg/kg and inj. Etomidate0.3mg/kg.Inj Rocuronium bromide0.9mg/kg i.v given to facilitate intubation.Anesthesia was maintained with100% oxygen,Inj.Midazolam0.01mg/kg/hr,InjVecuronium0.05mg/kg every half hourly.Incremental dose of Inj.Fentanyl1µg/kg was given to maintain BIS index between 40-60,with a maximum dose of 20µg/kg.Throughout this period patients were mechanically ventilated with 100% O_2 at a rate of 12-16breaths/min and tidal volume 8-10ml/kg.It was readjusted according to blood gas analysis reports aiming at a $PaCO_2$ of 35-45 mm Hg.A Glycerine Trinitrate infusion(at a rate of 0.1-10µg/kg/min)was started from the syringe pump beforehand to prevent coronary spasm and increase in heart rate.

Intraoperatively HR was maintained within the range of 60-90beats/min and MAP was maintained within60-80mmHg(maintained within 20% of the basal value).In case of bradycardia, atropine 0.01-0.02 mg/kg.was administered.Patients heart were electrically paced if they did not keep a required sinus rhythm 60 b/m.NTG up to10µg/kg/min or Diltiazem was used as vasodilator and noradrenaline was used as vasopressor to maintain a MAP between60-80mmHg during coronary anastomosis.NTG was also titrated according to ST segment changes in ECG.Hypotension was defined as MAP< 60mmHg persisting longer than 60sec and required inotrope.Dobutamine and adrenaline were added in patients who are unable to maintain MAP>60mmHg inspite of maximum dose of noradrenaline.CVP was kept >10 or ±4 of baseline CVP value.

Ringer's lactate at rates of 10-12ml/kg/hr started prior to and during anesthesia. Intravenous fluids given according to MAP and CVP. Blood was given if hematocrit fell to≤23%or hemoglobin<8g/dl. Normothermia was maintained.

Perioperative arrhythmias such as atrial fibrillation are the most common complications in patients undergoing CABG.So patients were carefully monitored with intraoperative continuous ECG monitoring system with automatic arrhythmias and ST segment analysis. Samples of blood for cTnT and creatinine kinase MB(CK-MB)were collected in correlation with ECG changes.A myocardial specific serum creatinine kinase level of 60ng/ml or more were associated with increased incidence of myocardial injury.

The chest was opened by standard complete median sternotomy. 100Units/kg heparin was administered after harvesting LIMA to

achieve an activated clotting time (ACT)>250 second during revascularization. On completion of all anastomoses0.3mg/kg protamine sulfate was administered to reverse the effect of heparin and return the ACT to <120 sec.

After surgery patients were shifted to ICU. All patients were extubated in the early postoperative period in ICU.Extubation criteria included an adequate level of consciousness and muscle power,$PaCO_2$ <45mmHg,SpO_2 >95% with FiO_2 0.4,PH is between7.35-7.45 together with stable hemodynamic and metabolic parameters, normothermia and absence of arrhythmias.

PRIMARY OUTCOME

1. Hemodynamic parameters:HR, MAP,CVP,ABG recorded at: Baseline,Before induction,after induction,after skin incision,after sternotomy,coronary artery anastomosis,after closure of sternum and end of surgery.

2. Total dose of fentanyl(µg/kg) required to maintain BIS value between 40-60

SECONDARY OUTCOME

1. Requirement of Inotropes or Vasodilators,Need for DC Shock,Number of patients who required either combination of inotropes or no inotropes was assessed.Intraoperative fluid and transfusion requirement.

3. Assessment of Troponin 'T' & CK-MB levels at baseline and 9hr postoperatively.

4.Time to awakening,time to extubation, duration of ICU stay

5. Assessment of complications among both the groups

STATISTICAL ANALYSIS

Statistical analysis was performed with the SPSS, version 11 for Windows statistical software package.To test the normality of data distribution Kolmogorov-Smirnov test was done.The Categorical data was presented as numbers and were compared using Fisher's exact t test.The quantitative data was presented as mean and standard deviation and were compared by student t-test.A'p'value<0.05was considered statistically significant.

RESULTS

Table1 Demographic and operative parameters

Parameters	GA (n=28)	GA+TEA (n=28)
Age (yr)	49.82±6.04	50.67±8.14
Wt (kg)	61.17±8.68	61.21±8.68
Height (cm)	170.39±8.34	169.21±7.62
BSA (m^2)	2.9±0.51	2.87±0.47
EF(%)	45.67±8.16	48.75±9.26
ASA II/III	9/19	10/18
Female/Male	4/24	2/26
Duration of surgery(min)	213.6±58.87	200.07±41.66
Number of grafts	3.03±1.03	2.71±0.76

Demographic data and operative parameters were comparable in both the groups(Table1). Intraoperative requirement of drugs and fluids were lass in GA+TEA group as shown inTable2.No difference was observed for HR and CVP among both groups. MAP was significantly lower in GA+TEA group(Figure1).Number of troponin T positive cases were15/28in GA group and10/28 inGA+TEA group. CK-MB levels were significantly increased in GA group (35.55±11.14) compared to GA+TEA group (19.41±7.4) (p=0.01). Time to awakening, extubation and duration of stay in ICU was significantly lower and incidence of complications was also significantly less in GA+TEA group.

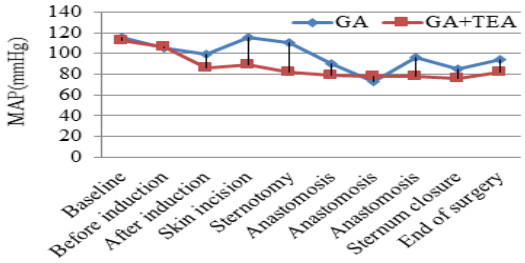

Figure1 Perioperative changes in Mean Arterial Pressure(MAP)

Table 2:Intraoperative requirement of drugs and fluid balance

Parameters	GA (n=28)	GA+TEA (n=28)
Additional fentanyl dose (µg/kg)	12.19±2.6	6.69±2.18#
Nitroglycerine dose(µg/kg/min)	1.41±0.64	0.41±0.2#
Noradrenaline dose (µg/kg)	3.78±1.76	6.69±4.58#
Diltiazem dose (mg/kg)	1.06±0.36	0.35±0.12#
Number of DC Shock	4±1.86	2±1.41#
Noradrenaline alone	8	10
Combination of inotropes	19	10#
Requirement of no inotrope	1	8#
Crystalloids (ml)	3672±435	2785±537#
Colloids (ml)	164±18	285±20#
Fluid balance (ml)	1543±236	1950±384#
Blood transfusion	9	4

Data are presented as mean±SD or number of patients. #p< 0.05 significant compared with GA group.

DISCUSSION

We have demonstrated from this study that TEA plus GA in patients with CAD for OPCAB allows better hemodynamic stability, reduced requirement of opioid, better myocardial protection and faster recovery in postoperative period.Gamal Z et al found that TEA provide a significant lower HR and MAP compared with the GA and perioperative CVP showed no significant differences. also found that total required dose of intraoperative fentanyl and nitrogly cerine and time to extubation were significantly lower in TEA(2).Hala Elsheikh, et al also found that MAP was lower in GA+TEA group(3). Michal Porizka, et al concluded that quality of analgesia and hemodynamic stability was higher and perioperative mortality was less in GA+TEA. they also observed that number of patients who required inotropes were more in TEA group compared to GA group but it was not significant. Similar to our study total dose of norepinephrine tended to be lower in the TEA group compared to the GA group but did not reach a statistical significant(4).Mikhail Y Kirov et al observed that EA decreases arterial pressure transiently, reduced the consumption of propofol by 15%, fentanyl by 50% and NTG by a 7 fold, but increased the requirement in colloids and vasopressors by 2 and 3-fold , respectively(p<0.05)(5).

Ercan Gurses,concluded that HTEA may improve balance between oxygen presentation and usage by suppressing neuroendocrine stress response, provide efficient postoperative analgesia, more stable hemodynamic, respiratory conditions(6).

In contrast to our study Dheeraj Arora et al found that Troponin T was significantly lower in GA+TEA group at day 5 while CK-MB levels were not significantly different among both groups(7).Massimo Caputo et al observed that incidence of arrhythmias and the median intubation time were significantly lower in the GAE group(8).

S Ferdous,found that requirement of inotropic support,time to extubation,ICU stay and incidence of cardiac dysrhythmias was less in groupTEA+GA(9).In the study done by Hala Elsheikh, none of the patient developed perioperative myocardial infarction. The incidence of perioperative AF was significantly lower GA+TEA

group. The serum concentration of c TnT and CK-MB increased in both groups but more pronounced in GA group of patients with significantly higher values compared with GA+TEA group(3).

Despite the obvious benefits of thoracic epidural anaesthesia and analgesia, it is related to infrequent but potential serious complications such as epidural infections, persistent neurological injury and especially epidural hematoma which may theoretically increase with anticoagulation in cardiac surgery. However, Royse showed the safety of high thoracic epidural analgesia in cardiac surgery as well as in non cardiac surgery(10). Similarly Bracco, Hemmerling reported the risk of catheter related epidural hematoma in cardiac surgery as 1 epidural hematoma for 12000 epidural catheterization process(11). We placed an epidural catheter in all of the patients the day before surgery and did not observe any epidural hematoma or neurological complications. This is consistent with the safety profile of epidural interventions demonstrated in the literatures. We think that we should not give up on TEA because of the mentioned rare complications

CONCLUSION

We recommend the use of TEA in patients undergoing OPCABG due to its advantages and absense of potential risk associated with technique. However benefits of TEA for cardiac surgery have been demonstrated only in a small preliminary study and further studies are required. So, we have a long way to go, but we have all the necessary tools to demystify cardiac anaesthesia, TEA being probably an important trigger of a novel chain reaction.

REFERENCES

1. Ashraf Fawzy,Walid S. Taha et al(2013).Awake versus combined general and epidural technique for off pump coronary artery bypass grafting surgery: A retrospective comparative study. The Egyptian Journal of Cardiothoracic Anesthesia ,7,56-62.
2. Gamal Z. El-Morsy,Alaa El-Deeb(2012).The outcome of thoracic epidural anesthesia in elderly patients undergoing coronary artery bypass graft surgery; SJA,jan-march, 6(1).
3. Hala Elsheikh, Saeed M.R.Elassy (2008).Impact of high thoracic epidural analgesia on incidence of perioperative stress response in off pump CABG.The Journal of Egyptian Society of Cardiothoracic surgery March-June16,(1-2).
4. Michal Porizka, Katerina Koudelkova et al(2016).High Thoracic Epidural Anesthesia offers no major benefit over general anesthesia in on pump cardiac surgery patients: a Retrospective study.Springer plus,5,799.
5. Mikhail Y Kirov, Aklexey V Eremeev,(2011).Epidural anesthesia and postoperative analgesia with ropivacaine and fentanyl in OPCAB surgery: A Randomized controlled study. BMC Anesthesiology,11,17.
6. Ercan Gurses, Dervis Berk,et al(2013).Effects of high thoracic epidural anesthesia on mixed venous oxygen saturation in coronary artery bypass grafting surgery. Clinical Research,19,222-229.
7. Dheeraj Arora, Rajiv Juneja,et al(2015).Nonanalgesic benefits of combined thoracic epidural analgesia with general anesthesia in high risk elderly off pump coronary artery bypass patients. Annals of cardiac anesthesia,18(3),385-391.
8. Massimo Caputo, Hazaim Alwair, et al(2011).Thoracic epidural anesthesia improves early outcomes in patients undergoing off-pump coronary artery bypass surgery.Anesthesiology,114,380-90.
9. S Ferdous, S Hossain et al(2010).Comparison of recovery and postoperative analgesia between thoracic epidural anesthesia plus general anesthesia and general anesthesia alone,in patients undergoing off-pump coronary artery bypass surgery. Cardiovasc. j,2(2),156-62.
10. Royse C.F(2009). High thoracic epidural anesthesia for cardiac surgery. Current Opinion in Anesthesiology,22(1),84-87.
11. Bracco D.Hemmerling T(2007).Epidural analgesia in cardiac surgery: an updated risk assessment. The Heart Surgery Forum,10(4),E334-337.