

Minimally Invasive Direct Coronary Artery Bypass Versus Off-Pump Coronary Artery Bypass Via Median Sternotomy: Is Postoperative Pain Treatment in the Intensive Care Unit Different?

(#2001-6693 ... June 27, 2001)

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Presented at the Fourth Annual Scientific Meeting of the International Society for Minimally Invasive Cardiac Surgery, June 27-30, 2001, Munich, Germany.

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ABSTRACT

Background: An important goal of minimally invasive direct coronary artery bypass (MIDCAB) is to reduce postoperative pain. The aim of the study was to analyze postoperative pain treatment in patients after MIDCAB procedures in comparison with off-pump coronary bypass procedures via median sternotomy (OPCAB).

Methods: A retrospective study was performed. The data of 19 consecutive patients undergoing MIDCAB and of 22 patients with OPCAB were analyzed.

Results: Preoperative data of both groups were comparable. Pain treatment in the intensive care unit was similar between the two groups: average dosage of piritramide was 9.4 ± 7.7 mg in MIDCAB vs. 9.3 ± 6.9 mg in OPCAB, of pethidine 26.0 ± 44.5 mg vs. 9.5 ± 21.6 mg and of diclofenac 73.7 ± 73.3 mg vs. 95.2 ± 97.3 mg, respectively. The differences in pain treatment did not reach statistical significance.

Conclusions: Pain treatment in the intensive care unit was between patients with MIDCAB and OPCAB procedures comparable.

INTRODUCTION

Postoperative pain increases heart rate and sympathicotonia leading to additional consecutive heart rate and blood pressure increase which results in elevated oxygen consumption. In the early postoperative phase higher risk of myocardial ischemia results. An important goal of minimally invasive direct coronary artery bypass (MIDCAB), which requires smaller incisions than other revascularization operation, was, and still is, to reduce postoperative pain.

Previous studies reported less pain postoperative in patients undergoing less invasive surgical procedures (including minithoracotomy in combination with cardiopulmonary bypass) if compared with patients undergoing conventional bypass surgery [Gulielmos 1999b]. Comparable data were reported in patients with bypass surgery without cardiopulmonary bypass [Gulielmos 1999a]. Although little is known about early postoperative stress and pain, and their treatment in intensive care unit.

The aim of the study was to analyze postoperative pain treatment in the intensive care unit of patients after MIDCAB procedures in comparison with off-pump coronary bypass procedures via median sternotomy (OPCAB).

MATERIALS AND METHODS

A retrospective study was performed. The data of 41 consecutive patients with less invasive bypass surgery were analyzed: 19 patients underwent MIDCAB and 22 patients OPCAB. Patients with conversion of the surgical approach during operation were excluded from the study.

The surgical technique for MIDCAB utilized an 8-cm left anterior minithoracotomy incision at the fifth intercostal space and chest entrance without rib resection. OPCAB procedures were carried out through complete midline sternotomy.

Postoperative treatment in the cardiac surgery intensive care unit was performed by an experienced team of physicians and nurses. Analgetic treatment was individual for each patient.

Data are presented as mean \pm standard deviation. Statistical analysis was performed using chi-square or t-test with $p < 0.05$ considered as significant.

RESULTS

Both groups were comparable: 15 patients were male in MIDCAB group and 4 female; in OPCAB group 19 were male and 3 female. Mean age in MIDCAB was 58.6 ± 11.5 years vs. 59.6 ± 11.5 years in OPCAB. Preoperative variables of both groups are listed in Table 1.

In the MIDCAB group all patients had left internal mammary artery grafts to left anterior descending artery. In the OPCAB group all patients had left internal mammary artery grafts and saphena vein grafts; mean graft number was 1.9 ± 0.8 (range 1 to 4 grafts).

Duration of postoperative mechanical ventilation was 5.7 ± 4.9 hours in MIDCAB patients vs. 8.3 ± 3.7 hours in the OPCAB patients and although 3 patients of the MIDCAB group only were extubated in the operating room this differences did not reach statistical significance.

Pain treatment in the intensive care unit was comparable (Table 2). The differences between the two groups did not reach statistical significance. Adverse effects of analgesia were not found.

DISCUSSION

Adequate pain treatment after cardiothoracic surgery is important for prevention of postoperative complications. Pain levels after any type of cardiac surgery are relatively low in most patients [Walther 1999]. Although pain perception is individual rather than standardized, sufficient analgesia is indicated to avoid adverse effects in postoperative course.

In early postoperative period pain may results in myocardial ischemia due to increased concentrations of stress hormones with consecutive blood pressure and heart rate increase which is associated with increased myocardial oxygen consumption [Mangano 1992]. In this early period after surgery individual nurse-controlled (or doctor-controlled) analgesia in the intensive care unit is effective due to close supervision and personnel experience.

The term minimally invasive cardiac surgery implies that patients have small incisions, less pain and in general, less discomfort. We found that postoperative pain treatment in the intensive care unit was comparable between patients with MIDCAB and OPCAB procedures. It seems likely that the close medical and nursing supervision in the intensive care unit may facilitated more effective pain relief and adequate treatment.

The current focus in fast-track anesthesia in combination with minimally invasive cardiac surgery that facilitates early extubation and early intensive care unit discharge should not create a group of patients with more pain due to the lack of expedient pain treatment by intensive care unit staff.

In later postoperative course, usually after intensive care unit discharge, pain may lead to deterioration of pulmonary function because of inadequate and shallow breathing

[Lichtenberg 2000]. Good analgesia has to be continued after intensive care unit discharge. Patient-controlled analgesia, intrapleural or epidural catheter techniques probably may facilitate further pain treatment [Gust 1999, Mehta 1998].

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Table 1. Preoperative variables in both groups.

	MIDCAB (n=19) [n=]	OPCAB (n=22) [n=]
Diabetes	2	1
Renal failure	2	-
Hypertension	12	10
Hyperlipoproteinemia	8	8
Chronic lung disease	2	1
Peripheral vascular disease	1	2
Cerebrovascular disease	1	-
Cerebrovascular accident	1	1
Previous myocardial infarction	4	8
Prior PTCA	2	3
Smoker	6	5

Table 2. Average dosage of used analgetics for pain treatment in the intensive care unit.

	MIDCAB (n=19)	OPCAB (n=22)
piritramide (mg)	9.4±7.7 (n=14)	9.3±6.9 (n=18)
pethidine (mg)	26.0±44.5 (n=7)	9.5±21.6 (n=4)
diclofenac (mg)	73.7±73.3 (n=12)	95.2±97.3 (n=12)