

COMPARISON BETWEEN EARLY AND LATE CHEST DRAINS REMOVAL POST CORONARY ARTERY BYPASS GRAFTING, REGARDING POST OPERATIVE CLINICAL OUTCOME; IS THERE ANY DIFFERENCE?

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ABSTRACT

Objective: The goal of this study is to highlight the consequences of various timing of chest tube removal following coronary artery by pass grafting on patients postoperative course.

Material and methods: This is prospective randomized study which was conducted in Queen Alia heart institute between January 2010 to June 2010 on 202 patients who underwent coronary artery by pass grafting. Patients were divided into two groups each consisted of 101 patients, group A where patients that had their chest drains removed after 24hrs, where group B had their chest drains removed after 48hrs.

Results: In group A, 65.2% were males where in group B 64.8% were males, mean age was 58.59±8.3year, 59.48±7.3year for group A, B respectively. Regarding operative details TPT (total pump time) was 77.42± 23.32 minute for group A, while it was 79.52±22.0 minute for group B.

In group A 9.75% of patients developed significant left pleural effusion, while 7.8% developed significant left pleural effusion in group B, $P > 0.5$. At the same time, 52.9% of patients in group A developed pericardial effusion while 47% developed pericardial effusion in group B, $P > 0.10$.

Concerning mobilization, 21.5% patients in group A are mobilized after 24 hrs in contrast to 10.7% in group B, $P < 0.05$. Evidence of atelectasis on CXR or chest CT scan was found in 42.15% in group A in contrast to 57.8% in group B, $P < 0.05$.

Conclusion: Timing of chest drain in patient who underwent coronary artery bypass grafting whether early or late was not found to be related to the post operative development of pleural effusion or pericardial effusion, however, early chest drains removal helps in early mobilization of patients due to less post operative pain, at the same time, this resulted also, in less incidence of atelectasis and chest infection.

Key words: Chest drain, coronary artery bypass graft, timing, removal.

INTRODUCTION

Insertion of chest tubes are considered an essential part of any cardiac surgery especially coronary artery by pass grafting as they help in preventing the accumulation of blood, fluid and air in the mediastinal or pleural space [1, 2]. There is still some debate regarding the best timing of chest drain removal, because some studies recommend keeping drains for longer period to prevent the collection of either air or fluid, however other studies believe in early removal of drains which might decrease pain and discomfort that were experienced frequently by the patients with consequent minimizing of the adverse effects related to increased incidence of chest infection [1]. In this study, I am going to address both views with the possible clinical consequences on patients.

PATIENTS AND METHODS

This was prospective randomized study which was conducted between

January 2010 to June 2010 on patients undergoing coronary artery bypass grafting. Patients were randomized into two groups, group A (n = 101) where chest drains from both left pleura and pericardium were removed after 24hrs, provided that there is no more than 100cc blood loss during the last 8hrs, and group B (n=101) in which chest drains were removed after 48hrs. I had certain exclusion criteria which included losses more than 1 liter in the first day or losses that necessitated exploration, moreover use of intra aortic balloon device, mechanical ventilation for more than 24hrs, redo surgery and off pump surgery were excluded.

Same anesthetic and operative techniques were used in both groups in addition to same surgical staff and nurses taking care of both groups. Continuous variables were represented as means ± standard deviation, at the same time, chi square was used to analyze the data, so that

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$P < 0.05$ was considered to be statistically significant.

RESULTS

In this study, I assessed 202 patients who underwent coronary artery bypass grafting who were divided into two groups. Mean chest tube removal time in group A was 21.45 ± 3.52 hr, while it was 41.25 ± 3.45 in group B. Patients were 65.2% male, 34.8% female in group A, while there were 64.8% male, 35.2% female in group B. Mean age was 58.59 ± 8.3 year, 59.48 ± 7.3 year in both groups respectively. Other patient characteristics were represented in table (1).

Regarding operative details, TPT (total pump Time) was 77.42 ± 23.32 minute for group A while it was 79.52 ± 22.20 minute for group B, meanwhile the mean aortic cross clamp time was 48.17 ± 16.52 minute for group A compared to 49.23 ± 15.82 minute for group B. table (2)

The overall incidence of symptomatic left pleural effusion during 6 weeks follow – up period was 9.75% in group A compared to 7.8% in group B which was not found to be significant statistically $P > 0.5$.

Echocardiographic evidence of pericardial effusion during 2-weeks follow – up period was (54 / 102) 52.9% in group A in contrast to (48/102) 47% in group b $P > 0.10$.

Mobilization assessment showed significant difference in mobilization ability of the patients, after 24 hrs in group A in comparison to group B, with 21.5% of patients were mobilized in group A while 10.7% were mobilized in group B $P > 0.05$.

There was significant difference in the development of atelectasis between patients belonging to group A compared to group B, 42.15%, 57.8% respectively ($P < 0.05$).

DISCUSSION

Pleura effusion is relatively obvious phenomena post coronary artery bypass graft surgery, occurring in up to 50 to 75% of patents [3] in the 1st week after

surgery, though the collected amount is small in the majority of cases which doesn't mandate drainage, however symptomatic left pleural effusion occurs in about of 12% of coronary artery bypass graft surgery during 6 weeks perio2d [3].

Pleural effusion is more common following left internal mammary artery harvest [4, 5] which could be related to the accumulation of blood in the pleural cavity, or even to the harvest itself with corresponding row surface yielding serous fluid [4, 5]. In this study, timing of chest drain removal was not found to be significant contributing factor to the development of left pleural effusion when comparing the two groups ($P > 0.5$) which is noticed in a study by Sadeghi and his colleagues [1]

Evidence of pericardial effusion post coronary artery bypass grafting occurs in over 55% on the 6th postoperative day [6, 7]. The routine use of pericardial drain helps in decreasing the development of pericardial effusion and tamponade. The postoperative incidence of cardiac tamponade is between 0.1 and 6.0% [8] which can be reduced by appropriate use of certain types of drains especially the standard ones in comparison to the semi-rigid ones as elaborated in a study conducted by Turan Ege and his colleagues [8], but in this study timing of pericardial chest drain removal was not found to be significant factor in the development of pericardial effusion.

Post operative mobilization is a crucial factor for patients who underwent coronary artery bypass grafting in order to prevent chest infections which has been reported in 10.8% of cardiac operations [9, 10]

Mobilization can be enhanced by reducing the post operative pain related to incision and tissue dissection, but more importantly, is the pain that can be due to chest drains, which stimulate pain sensing fibers at the sites of insertion.

In this study 21.5% of patients in group A were mobilized after 24 hours in

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comparison to 10.7% in group B (P < 0.05). However a study done by Dan Abramor and his colleagues [6] found that timing of chest drain removal was not significant factor for the mobilization, on the other hand a study by Xavier and his colleagues [9] showed that early chest drain removal limits pain sensation with consequent encouragement of mobilization.

Pain created by the chest tubes causes shallow and inefficient ventilation with consequent decrease in sputum evacuation and eventually atelectasis, which was clearly obvious in this study with significant difference between the two

groups in the development of atelectasis on the CXR and chest CT scans (group A = 42.15%, group B = 57.8 P < 0.05].

CONCLUSION

Timing of chest drain removal in patient who underwent coronary artery bypass grafting, whether early or late was not found to be related to the post operative development of pleural effusion or pericardial effusion, however, early chest drains removal helps in early mobilization of patients due to less post operative pain, and at the same time it results in decrease incidence of atelectasis and chest infection.

**Table (1)
Patients Characteristics**

	Group A n = 101	Group B n = 101	P value
Age	58 ± 8.3year	59.48 ± 7.3year	NS
Male	65.2%	64.8%	NS
HT	54.3%	55.6%	NS
DM	39.2%	38.7%	NS

* NS not Significant

**Table (2)
Operative details**

	Group A	Group B	P value
TPT (total pump time)	77.42 ± 23.32 minutes	79.52 ± 22.20 minutes	NS
ACX (aortic cross clamping)	48.17 ± 16.52 minutes	49.23 ± 15.82 minutes	NS

**Table (3)
Post operative parameters**

	Group A n = 101	Group B n = 101	P value
Left pleural effusion	9.75%	7.8%	P > 0.5
Pericardial effusion	52.9%	47%	P > 0.10
Mobilization after 24 hrs	21.5%	10.7%	P < 0.05
Atelectasis on CXR or Chest CTScan	42.15%	57.80%	P < 0.05

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REFERENCES

1. Sadeghi M, Etesampour A, Gharipour M, shariat Z, Nilforoush P, Saeidi M, et al. Early chest tube removal after coronary artery by pass graft surgery. *North Am J Med Sci* 2009; 1: 333 – 337.
2. Abramov D, yeshaaiahu M, Tsodikov V, Gatot I, Ormans, Govriet A, et al. timing of chest tube removal after coronary artery by pass surgery. *J card surg* 2005 March; 20 (2): 142 – 146.
3. Payne M, Magovern G, Benkart D, Vasilakis, A, Szydlowsk G, et al. Left plural effusion after coronary artery by pass decrease with a supplemental pleural drain. *Ann thorac surg* 2002; 73: 149 – 152.
4. Huribut D., Myers M. L., Lefcoe M., Gold boch M. Pleuro pulmonary morbidity internal thoracic artery versus Saphenous vein grafts. *Ann Thorac Surg* 1990; 50: 959 – 964.
5. Kollef M. H. Symptomatic pleural effusion after coronary artery revascularization: unsuspected pleural injury from internal mammary resection *south med* 1993; 86: 586 – 588.
6. Abromov D, Yeshaaiahu M, Tsodikov V, Gatot I, orman S, et al. timing of chest tube removal after coronary artery by pass surgery. *J card surg* 2005; 20: 142 – 146.
7. Meurin P, Weber H. Evolution of the post operative effusion after Day 15 is the problem of late tamponade. 2004; 125 (6): 2182 – 2187.
8. Ege T, Tatti E, Ganbaz S, Cikirkcioglu M, Sunar H. et al. The importance of intra pericardial Drain Selection in cardiac surgery. *Chest* 2004; 126; 1559 – 1562.
9. Muller X, Tingely F, Tevaearai H, Ravussin P, Stumpe F, et al. Impact of duration of chest tube drainage on pain after cardiac Surgery. *Eur J cardio thorac Surg* 2002; 18: 570 – 574.
10. Zickmann B., Sablotzk, A, fussle R, Gorlach G., Hempelmann G. Perioperative microbiologic monitoring of tracheal aspirates as a predictor of pulmonary complication after cardiac operations. *Thorac cardiovasc surg* 1996; 111; 1213 – 1218.