Original Article

Prayer Sign as a Marker of Increased Ventilatory Hours, Length of Intensive Care Unit and Hospital Stay in Patients Undergoing Coronary Artery Bypass Grafting Surgery

Abstract

Context: Various predictors have been used to predict diabetic patients who are likely to have increased ventilatory hours and an increased length of stay (LOS) in the Intensive Care Unit (ICU) as well as in the hospital after undergoing coronary artery bypass grafting (CABG) surgery, for example, glycosylated hemoglobin (HbA1c). The authors propose a simple bed-side test, i.e., the prayer sign to predict increased ventilatory hours and increased length of ICU and hospital stay. **Aims:** The aim of the present study was to assess whether any association exists between a positive prayer sign and increased ventilatory hours, length of ICU and hospital stay after CABG surgery in diabetic patients. **Settings and Design:** This prospective observational study was conducted in a 650-bedded tertiary cardiac center. **Subjects and Methods:** A total of 501 diabetic patients were recruited in the study over a period of 1 year. Group P consisted of 121 patients with prayer sign positive, whereas Group N consisted of 380 patients with prayer sign negative. HbA1c levels, ventilatory hours, LOS in the postoperative ICU and hospital were compared. **Statistical Analysis Used:** Unpaired Student's *t*-test was used to compare the data. **Results:** The mean HbA1c levels in Group P were 8.01 ± 2.28% as compared to 6.52 ± 2.46% in Group N ($P < 0.0001$). The mean ventilatory hours in Group P were 9.52 ± 6.46 h, and in Group N were 7.42 ± 8.01 h ($P = 0.013$). Whereas, the mean length of ICU stay and hospital stay in Group P was 156.42 ± 32.66 h (6.51 ± 1.36 days) and 197.36 ± 32.46 h (8.22 ± 1.35 days), respectively, it was 121.12 ± 29.48 h (5.04 ± 1.22 days) and 178.52 ± 28.52 h (7.43 ± 1.18 days) in Group N ($P < 0.0001$). **Conclusions:** A positive prayer sign is a useful bedside test for predicting increased ventilatory hours and increased length of ICU and hospital stay after CABG surgery.

Keywords: *Coronary artery bypass grafting surgery, length of intensive care unit stay, length of hospital stay, Prayer Sign*

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Introduction

Fast-tracking after various surgeries including after coronary artery bypass grafting (CABG) surgery is beneficial for both the patients as well as the health-care facility. A number of factors have been elaborated which increase the morbidity and length of stay (LOS) after CABG surgery. Among all the preoperative factors, emergency operation, type of procedure, age, diabetes mellitus (DM), renal dysfunction, cerebrovascular accidents, reoperation, female gender, and left ventricular dysfunction are described as significant predictors of morbidity and prolonged Intensive Care Unit (ICU) stay.[1]

DM is one of the most common factors which increases the morbidity and mortality in patients undergoing CABG surgery.[2,3] Various predictors have been used in the past to predict diabetic patients who are likely to have an increased LOS in the postoperative ICU and in the hospital after undergoing CABG surgery, for example, glycosylated hemoglobin (HbA1c).[4] The authors propose a simple noninvasive test, i.e., the prayer sign, which may be done at the time of first patient contact with the anesthesiologist and can be used to predict increased ventilatory hours and an increased postoperative LOS in the ICU and the hospital.

The prayer sign (inability to approximate the palmar surfaces of the phalangeal joints despite maximal effort) is a useful sign to predict difficult intubation in diabetic patients.[5] It occurs due to abnormal thickening of the dermis and fibrosis of subcutaneous tissue that occurs as a result

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of nonenzymatic glycosylation of collagen consequent to prolonged hyperglycemia.[6] The authors observed that patients with prayer sign positive had an increased length of ICU stay. Hence, the authors hypothesized that a positive prayer sign may be a useful bedside test for predicting increased ventilatory hours and an increased length of ICU and hospital stay after CABG surgery. Although this sign may not be any more indicative than any other one denoting the severity of preexisting diabetes, but since it is noninvasive and can be done in the PAC clinic without any patient discomfort, it may be regarded as one of the warning signs in a patient scheduled to undergo CABG surgery. If steps are undertaken to achieve a better glycemic control in such a patient, the outcomes may be much better.

The aim of the present study was to assess whether any association exists between a positive prayer sign and increased ventilatory hours, length of ICU and hospital stay after CABG surgery in diabetic patients.

Subjects and Methods

This prospective observational study was conducted in a 650-bedded tertiary cardiac center.

Five hundred one diabetic patients undergoing elective CABG surgery were recruited in the study over 1 year after taking written informed consent from all the patients. Exclusion criteria were patient's refusal, rheumatoid arthritis or any other preexisting joint problem, preexisting renal dysfunction or any other complication of DM and low ejection fraction (<40%). To further reduce any bias, it was decided to standardize the surgery as off-pump CABG undergoing three grafts, and on-pump CABG patients were excluded from the study.

Prayer sign was performed in all patients. Patients were asked to approximate the palmar surfaces of the two hands. If despite maximal effort patient was unable to approximate the phalangeal joints, it was considered as prayer sign positive.

Accordingly, the patients were allocated to two groups:

1. Group P - Consisted of 121 patients with prayer sign positive
2. Group N - Consisted of 380 patients with prayer sign negative.

HbA1c levels were done in all patients. Ventilatory hours, LOS in the postoperative ICU and in the hospital were compared in the two groups. It was decided that patients with surgical causes of increased length of ICU and hospital stay (surgical rebleeding and re-explorations) would be excluded from the study.

Results were expressed as mean ± standard deviation, unpaired Student's *t*-test was used to compare the data.

Results

Five patients in Group P and 9 patients in Group N had mortality (P = 0.341). Ten patients in Group P and 17 patients in Group N (P = 0.106) had surgical re-exploration and were eventually excluded from the study. Rest of the patients completed the study protocol (i.e., were discharged from the hospital).

The mean age, weight, duration of diabetes, and duration of grafting were comparable in the two groups [Table 1]. All of these could be potential confounders in the result analysis. But since all these were comparable in the two groups, hence the glycemic control indicated by the prayer sign may be the cause of any difference in the ICU and hospital stay in the two groups.

The mean HbA1c levels in Group P were 8.01 ± 2.28% as compared to 6.52 ± 2.46% in Group N (P < 0.0001). The mean ventilatory hours in Group P were 9.52 ± 6.46 h and in Group N were 7.42 ± 8.01 h (P = 0.013). Whereas, the mean length of ICU stay in Group P was 156.42 ± 32.66 h (6.51 ± 1.36 days), it was 121.12 ± 29.48 h (5.04 ± 1.22 days) in Group N (P < 0.0001). Similarly, the mean length of hospital stay was significantly longer in Group P (197.36 ± 32.46 h, i.e., 8.22 ± 1.35 days) as compared to Group N (178.52 ± 28.52 h, i.e., 7.43 ± 1.18 days) (P < 0.0001).

Discussion

Cost containment and efficient resource use have forced the pendulum back to the debate of early tracheal extubation and fast-tracking in cardiac surgical patients.[7,8] In this era of cost containment and physician report cards, doctors are held accountable for patients' outcome in terms of mortality, morbidity, quality of life, LOS, and costs of care. It has recently been demonstrated that early tracheal extubation and fast-track anesthesia is safe, cost beneficial, and can improve resource use in cardiac surgery.[9,10]

Fast-tracking after cardiac surgery is a complex intervention involving several components of care during anesthesia and in the postoperative period, all with the ultimate aim of early extubation after surgery, to reduce the LOS in the ICU and in the hospital. Safe and effective fast-track cardiac care may help the patient to get back to normal life earlier.[11]

DM is associated with coronary artery disease, and diabetic patients are frequently referred for coronary bypass grafting surgery. It is well known that HbA1c, which reflects long-term glycemic control, is related to diabetic morbidity

Table 1: Comparison of the patient population between the two groups

	Group P	Group N	*P*
Age (years)	58.32±15.66	59.20±15.94	0.617
Weight (kg)	73.56±24.32	69.82±23.24	0.151
Duration of diabetes (years)	15.43±5.92	14.46±4.82	0.086
Duration of grafting (min)	58.48±19.66	55.62±21.58	0.223

and mortality.[12] It has also been suggested that HbA1c can be used as a surrogate marker for cardiac and noncardiac morbidity that prolongs hospitalization after coronary artery bypass surgery.[4]

However, many times during preoperative check-up, especially when the patient comes to the PAC clinic for the first time, the value of HbA1c is not available. In these situations, the authors felt that a simple noninvasive bedside test, i.e., the prayer sign positive, may predict an increased length of postoperative ICU and hospital stay in these patients. Hence, the present study was conducted to see if a positive prayer sign can be used as a marker of increased ventilatory hours and increased ICU and hospital stay in diabetic patients undergoing CABG surgery.

In this study, the mean HbA1c levels were higher in patients with the prayer sign positive. At the same time, the mean ventilatory hours, length of ICU stay as well as hospital stay was also significantly higher in these patients.

The results were similar to the study conducted by Medhi *et al*.[4] in which they found that higher levels of HbA1c were associated with a prolonged postoperative ICU stay after CABG surgery.

Thus a positive prayer sign elicited during the preanaesthetic check-up may be a warning signal for a worse outcome. If appropriate steps are taken, the outcomes can be better.

A limitation of the study was that there are many other confounding factors for increased postoperative ICU stay apart from DM. But because of the large sample size, these would have been evenly distributed in the two groups and negated any possible bias. Another limitation of the study was that the patients were not followed up after discharge. It would have been better if we could know whether the patients with the prayer sign positive had more complications and more hospital visits as compared to those with prayer sign negative. If such an association existed, it would be better to follow-up these patients more vigorously and take all possible control measures to avoid these complications.

Conclusions

A positive prayer sign is a useful bedside test for predicting increased ventilatory hours and an increased length of ICU and hospital stay in diabetic patients undergoing CABG surgery. It cannot be used as a surrogate of other predictors of increased ICU and hospital stay in diabetic patients, but it may be considered as a warning sign to predict postoperative morbidity.

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Conflicts of interest

There are no conflicts of interest.

References

1. Haanschoten MC, van Straten AH, ter Woorst JF, Stepaniak PS, van der Meer AD, van Zundert AA, *et al.* Fast-track practice in cardiac surgery: Results and predictors of outcome. Interact Cardiovasc Thorac Surg 2012;15:989-94.
2. Carson JL, Scholz PM, Chen AY, Peterson ED, Gold J, Schneider SH. Diabetes mellitus increases short-term mortality and morbidity in patients undergoing coronary artery bypass graft surgery. J Am Coll Cardiol 2002;40:418-23.
3. Giquel J, Rodriguez-Blanco YF, Matadial C, Candiotti K. Diabetes mellitus in anaesthesia. Br J Diabetes Vasc Dis 2012;12:60-4.
4. Medhi M, Marshall MC Jr., Burke HB, Hasan R, Nayak D, Reed G, *et al.* HbA1c predicts length of stay in patients admitted for coronary artery bypass surgery. Heart Dis 2001;3:77-9.
5. Erden V, Basaranoglu G, Delatioglu H, Hamzaoglu NS. Relationship of difficult laryngoscopy to long-term non-insulin-dependent diabetes and hand abnormality detected using the 'prayer sign'. Br J Anaesth 2003;91:159-60.
6. Ballantyne JA, Hooper G. The hand and diabetes. Curr Orthop 2004;18:118-25.
7. Cheng DC. Pro: Early extubation after cardiac surgery decreases intensive care unit stay and cost. J Cardiothorac Vasc Anesth 1995;9:460-4.
8. Guenther CR. Con: Early extubation after cardiac surgery does not decrease intensive care unit stay and cost. J Cardiothorac Vasc Anesth 1995;9:465-7.
9. Cheng DC, Karski J, Peniston C, Asokumar B, Raveendran G, Carroll J, *et al*. Morbidity outcome in early versus conventional tracheal extubation following coronary artery bypass graft (CABG) surgery: A prospective randomized controlled trial. J Thorac Cardiovasc Surg 1996;112:755-64.
10. Cheng DC, Karski J, Peniston C, Raveendran G, Asokumar B, Carroll J, *et al.* Early tracheal extubation after coronary artery bypass graft surgery reduces costs and improves resource use. A prospective, randomized, controlled trial. Anesthesiology 1996;85:1300-10.
11. Zhu F, Lee A, Chee YE. Fast-track cardiac care for adult cardiac surgical patients. Cochrane Database Syst Rev 2012;10:CD003587.
12. Rhee JJ, Ding VY, Rehkopf DH, Arce CM, Winkelmayer WC. Correlates of poor glycemic control among patients with diabetes initiating hemodialysis for end-stage renal disease. BMC Nephrol 2015;16:204.