

Early View Article: Online published version of an accepted article before publication in the final form.

Journal Name: Edorium Journal of Cardiothoracic and Vascular Surgery

doi: To be assigned

Early view version published: September 25, 2017

**How to cite the article:** Keyur Vora, Harish Vaja. Sudden cardiac death during symptom- free postoperative period of coronary artery bypass graft surgery: Mystery or solved? Edorium Journal of Cardiothoracic and Vascular Surgery. Forthcoming 2017.

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1 **TYPE OF ARTICLE:** Case Report

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3 **TITLE:** Sudden cardiac death during symptom- free postoperative period of coronary  
4 artery bypass graft surgery: Mystery or solved?

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17 **Short Running Title:** NOT GIVEN

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19 **Guarantor of Submission:** The corresponding author is the guarantor of  
20 submission.

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33 **ABSTRACT**

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35 **Introduction**

36 The risk of sudden cardiac death (SCD) in patients with diabetes after coronary  
37 artery bypass graft surgery (CABG) has not been studied in a contemporary clinical  
38 trials of surgical revascularization. This report analyses an incidence, timing and  
39 mechanistic predictors of SCD after CABG in a diabetic patient.

40

41 **Case Report**

42 We report a case of an elderly diabetic patient with normal left ventricular ejection  
43 fraction and relatively low-risk profile for elective CABG surgery. In an uneventful  
44 postoperative routine, SCD was unexpected on mild to moderate exertional activity.

45

46 **Conclusion**

47 The physiological events during defecation induced straining are simulated valsalva  
48 maneuver and may have led to syncope and cardiorespiratory arrest. Considering  
49 growing volume of diabetic patients with multivessel coronary artery disease,  
50 meticulous critical care monitoring guidelines are needed to be continuously  
51 optimized for successful postoperative intensive care.

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53 **Keywords:** Sudden Cardiac Death; Coronary artery bypass graft surgery; diabetic  
54 neuropathy

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**65 INTRODUCTION**

66 Sudden Cardiac Death (SCD) has been reported in post-operative coronary bypass  
67 graft surgery (CABG) with postoperative span of first week to several months later. It  
68 is well-known phenomenon that mortality risk is high among patients of severe left  
69 ventricular (LV) dysfunction (LVEF<30%) [1]. The STICH (Surgical Treatment for  
70 Ischemic Heart Failure) trial showed that in patients with ischemic cardiomyopathy,  
71 CABG with medical therapy resulted in higher mortality at 30 days, but with a  
72 significant improvement in long-term mortality (out to 10 years) compared with  
73 medical therapy alone [2]. However, SCD among patients of preoperative good LV  
74 function is rare. We report a case of 3 days postoperative CABG patient with  
75 relatively symptom-free period and SCD after routine physical activity.

76

**77 CASE REPORT**

78 A 70-year-old male diabetic (Type II) patient with BMI (27.8 kg/m<sup>2</sup>) was admitted with  
79 multi-vessel disease for elective CABG surgery. Patient was relatively asymptomatic  
80 and preoperative investigations were within normal limits. Echocardiography study  
81 reveals LVEF 52-55% and grade I diastolic dysfunction. The surgery was uneventful  
82 and postoperative recovery was normal. Diet, physiotherapy and intermittent  
83 noninvasive ventilation support were given as per the protocol of the institution for  
84 CABG patients. On day 3, patient had bowel movement with moderate straining  
85 without any symptoms or signs. However, without any premonitory symptoms,  
86 patient immediately underwent sudden unconsciousness without any prior changes  
87 in electrocardiogram (ECG). Patient underwent bradycardia and ECG revealed near  
88 asystole. Advanced Cardiac Life Support (ACLS) protocol was followed instantly and  
89 no delay reported in starting cardiopulmonary resuscitation (CPR).  
90 Echocardiography revealed regional wall motion with severe hypokinesia. Patient  
91 was revived for a brief period before undergoing recurrent asystole and could not be  
92 revived.

93

**94 DISCUSSION**

95 SCD among immediate postoperative period results from acute thromboembolism,  
96 tachyarrhythmias like supraventricular tachycardia (SVT), ventricular

97 tachycardia/fibrillation (VT/VF), myocardial suppression with preoperative severe LV  
98 dysfunction, graft occlusion or spasm, complicated diabetes or sepsis complications.  
99 Our case needs assessment in terms of other probable causes for SCD. Emergency  
100 echocardiography reveals severe LV dysfunction (LVEF<30%) with regional wall  
101 motion abnormality suggesting graft compromise. Fair RV function rules out any  
102 possibility of acute thromboembolism. The necropsy was not done due to consent  
103 issues and local laws.

104 The possibility of early graft rejection is a clinical challenge as patients don't express  
105 typical symptoms of myocardial infarction (MI). Apparently, diagnosis was not  
106 considered in the absence of new electrocardiogram (ECG) modifications or new  
107 regional wall motion abnormalities. Moreover, sudden cardiac death due to  
108 exertional syncope has been reported by Curtis et al. [3] and Kapoor et al [4]. The  
109 defecation straining leads to increased intrathoracic pressure with increased  
110 systemic arterial pressure and reflex bradycardia; resulting into prolonged  
111 neurocardiogenic or situational syncope causing severe bradycardia and slow flow in  
112 grafts which started a vicious cycle of myocardial ischemia, cardiorespiratory arrest  
113 and severe respiratory acidosis. Refractory bradycardia and hypotension  
114 unresponsive to atropine and ephedrine are highly likely in diabetic patients due to  
115 autonomic dysfunction [5]. The physiological events during defecation induced  
116 straining is simulated valsalva maneuver and may have led to syncope and  
117 cardiorespiratory arrest.

118

## 119 **CONCLUSION**

120 Our case report highlights the importance of advanced critical care monitoring  
121 especially in postoperative diabetic patients. High level of suspicion is of paramount  
122 importance in monitoring postoperative patients even with low cardiovascular risk  
123 profile. Our case report is one of the rare reports of CABG postoperative SCD; likely  
124 due to neurocardiogenic syncope with autonomic dysfunction even in the presence  
125 of good LV function and relatively symptom-free postoperative stay. Large pool of  
126 data on postoperative SCD and necropsy analysis would give vital information on  
127 potential mechanisms, risk/benefit evaluations, anaesthesiological management and  
128 would recuperate guidelines for meticulous cardiac postoperative intensive care.

129 Considering growing volume of diabetic patients with multivessel coronary artery  
130 disease, meticulous critical care monitoring guidelines are needed to be continuously  
131 optimized for successful postoperative intensive care.

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### 133 **CONFLICT OF INTEREST**

134 NO affiliations with or involvement in any organization or entity with any financial  
135 interest (such as honoraria; educational grants; participation in speakers' bureaus;  
136 membership, employment, consultancies, stock ownership, or other equity interest;  
137 and expert testimony or patent-licensing arrangements), or non-financial interest  
138 (such as personal or professional relationships, affiliations, knowledge or beliefs) in  
139 the subject matter or materials discussed in this manuscript.

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### 141 **GURANTOR OF SUBMISSION**

142 Guarantor of submission is KEYUR VORA – Corresponding author of the  
143 manuscript.

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### 145 **AUTHOR'S CONTRIBUTIONS**

146 Keyur Vora MD MSCR

147 Group 1- Substantial contributions to conception and design, acquisition of case  
148 details

149 Group 2- Drafting of article, revising it critically for important intellectual content

150 Group 3- Final approval of the version to be published

151

152 Harish Vaja, MS FRCS

153 Group 1- Substantial contributions to conception and design, acquisition of case  
154 details

155 Group 2- Drafting of article

156 Group 3- Final approval of the version to be published

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