

J Ivanov, MA Borger, JV Tu, V Rao, TE David. Mid-term outcomes of off-pump versus on-pump coronary artery bypass graft surgery. *Can J Cardiol* 2008;24(4):279-284.

Incomplete revascularization in beating heart surgery

To the Editor:

We would like to congratulate Dr Ivanov and co-authors on their retrospective review of mid-term outcomes of beating heart surgery (BHS) versus conventional on-pump coronary artery bypass (CCAB) graft surgery. Fewer coronary artery bypass grafts performed in the BHS cohort were correlated with a reduced interval of freedom from cardiac events or cardiac reintervention compared with the CCAB cohort. The finding that there are fewer bypass grafts performed in BHS cases than in CCAB cases, despite being matched for disease burden, is in complete concordance with our report (1) of 400 cases of propensity-matched BHS and CCAB. This was the first report in the literature to show that a BHS cohort had lower rates of complete revascularization than CCAB patients.

In a study of BHS and CCAB procedures (1) performed from 1997 through 2002, angiograms were reviewed and scored for vessel disease and graftability, and BHS and CCAB cases were matched for comorbidities and number of graftable vessels. We found that the BHS group received, on average, significantly fewer grafts than the CCAB group (2.4 ± 1.0 versus 3.2 ± 1.0 ; $P < 0.0001$). The greater the disease burden, the less likely the BHS group was to be completely revascularized. Patients with fewer than three diseased vessels grafted using the BHS technique were significantly less likely to be completely revascularized than CCAB patients (78% versus 94%; $P = 0.036$). In patients with three graftable vessels, complete revascularization was achieved in 51.2% of the BHS patients versus 80% of the CCAB patients ($P = 0.0003$), and in patients with more

TABLE 1
Technical graft details

	CCABG	OPCABG	P
Distal anastomoses, n	631	470	
Bypass number, n (%)			
Single	8 (4)	43 (22)	
Double	40 (20)	68 (34)	
Triple	89 (45)	69 (35)	
Quadruple	43 (22)	17 (9)	
Quintuple	16 (8)	2 (1)	
Graft conduit, n (%)			
Saphenous vein graft	98 (49)	72 (36)	0.0085
Left internal mammary artery	170 (85)	184 (92)	0.28
Right internal mammary artery	66 (33)	79 (40)	0.18
Bilateral internal mammary artery	60 (30)	68 (34)	0.39
Radial artery	74 (37)	28 (14)	<0.001
Graft distribution, n (%)			
Left anterior descending artery	167 (84)	184 (92)	0.0095
Diagonal artery	78 (39)	56 (28)	
RCA, AM, PLV, PDA	184 (92)	114 (57)	
Circumflex artery, RI, OM	198 (99)	114 (57)	
Total arterial grafts, n (%)	103 (52)	129 (65)	0.0084

AM Acute marginal artery; CCABG Conventional coronary artery bypass grafting; OM Obtuse marginal artery; OPCABG Off-pump coronary artery bypass grafting; PDA Posterior descending artery; PLV Posterior left ventricular artery; RCA Right coronary artery; RI Ramus intermedius artery. Data from reference 1

than three graftable vessels, the rates of complete revascularization in BHS versus CCAB patients were 17.6% and 51%, respectively ($P = 0.0012$). The graft distribution was significantly different between the BHS and CCAB groups (Table 1).

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LETTER TO THE EDITOR

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With previous evidence of incomplete revascularization in BHS patients (1), and the negative impact of incomplete revascularization on both early and late mortality rates and freedom from recurrent cardiac events (2,3), the finding by Dr Ivanov and colleagues is not surprising, but it is a very important contribution to the literature and provides a more complete picture of off-pump coronary artery bypass grafting and where it should fit in our surgical armamentarium.

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From the Authors:

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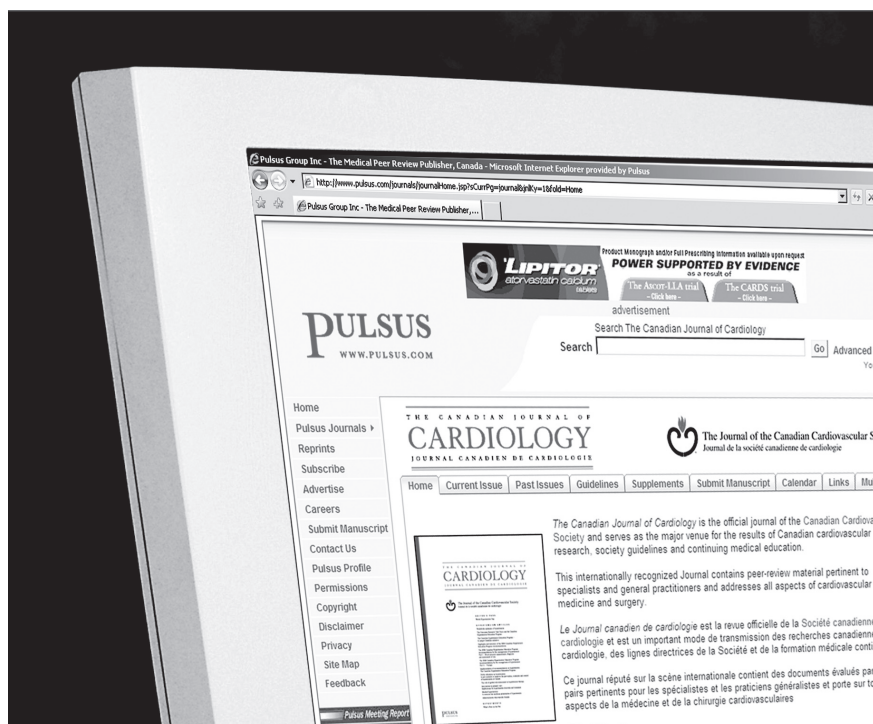
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