

**Publication:**

Intraoperative Bypass Flow Measurement Reduces the Incidence of Post-operative Ventricular Fibrillation and Myocardial Markers After Coronary Revascularisation

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**Abstract**

**Objective**

Sudden ventricular fibrillation (VF) and myocardial infarction (MI) are life-threatening complications after coronary artery bypass grafting (CABG). We prospectively analysed the impact of intraoperative bypass flow measurement with the transit time flow Doppler method (TTFD) on the incidence and outcome of postoperative VF and MI.

**Methods**

In 1995 a standardized algorithm for the treatment of postoperative VF was introduced in our institution. The rate of postoperative VF was therefore exactly registered. In 1998 the TTFD method was implemented as a standard in all CABG cases. Whenever insufficient bypass graft flow was detected, anastomoses were redone

and technical problems affecting the grafts were excluded. The incidence of postoperative VF and CK/CK-MB fraction was observed prospectively and the new data was compared to the data from 1995 to 1998.

**Results**

From 1/95 to 7/98 a total of 4321 patients (group A) were operated on with isolated CABG procedures using extracorporeal circulation. In the period from 8/98 to 10/02 a total of 3421 patients (group B) was operated on with isolated CABG procedures under the same conditions, except that the TTFD method was used in every case. The treatment of VF was standardised in both groups according to the algorithm. The most striking effect was the significant reduction of VF from 0.66% to 0.44% when TTFD was

introduced and the steep decrease in mortality from 30% to 12.2% in patients with VF when the algorithm and TTFD were routinely applied. Furthermore the rate of insufficient bypass flow detected by angiography was reduced by 66%.

**Conclusions**

Routinely the use of TTFD significantly reduced the incidence of postoperative VF, postoperative CK/CK-MB fraction, and angiographically detected bypass malfunction.

A simultaneously implemented algorithm reduced the mortality with VF after CABG. The consequent use of TTFD intraoperatively reduced the incidence of postoperative anastomosis and technically related complications of bypass surgery and led to a significant reduction of postoperative mortality in CABG procedures.

**Medistim comments**

This publications strongly supports the use of Medistim TTFM (transit-time flow measurement), although the authors mention some study limitations:

Not all patients who were analyzed with TTFM had a re-angiogram and the interpretations of the flow curves were subjective, done by maximum flow and PI value.

What strengthens the conclusion, is the high number of patients. Also, Group B had a significantly higher EuroScore than group A, indicating that group B should have a higher mortality rate. When the results turned out to be the opposite, the results are even stronger.

Other changes in surgical procedure were eliminated as causes for reduced mortality, leaving the introduction of TTFM as the impacting factor.

	Group A No TTFM n=4321	Group B TTFM n=3484
Perioperative MI*	1.6%	0.68%
VF incidence*	0.66%	0.44%
Anastomosis redo intraop.*	0.3%	3.2%
Overall mortality*	1.5%	1.2%

\* (p<0.05)