

The Safety of Intracoronary Ultrasound: A Multicenter Survey of 2207 Patients

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Abstract

Background

Intracoronary ultrasound (ICUS) is increasingly used in clinical practice to study the natural history of coronary artery disease and to assess the effects of intracoronary, catheter-based interventions. However, the risk associated with the procedure is not well documented.

Methods and Results

ICUS studies performed in 28 centers were retrospectively included; these centers agreed to contribute to the study among a total of 60 centers initially invited. Among the 2207 ICUS studies, 505 (23%) were performed in heart transplant recipients and 1702 (77%) in nontransplant patients. Indication for ICUS was diagnostic imaging in 915 (41%), drug testing in 244 (11%), and guidance for intracoronary interventions in 1048 patients (47%). There were no complications in 2034 patients (92.2%). In 87 patients (3.9%), complications occurred but were judged to be “not related” to ICUS by the operator. In 63 patients (2.9%), spasm occurred during ICUS imaging. In 9 patients (0.4%), complications other than spasm were judged to have a “certain relation” to ICUS, including acute procedural events in 6 (3 acute occlusion, 1 embolism, 1 dissection, and 1 thrombus) and major events in 3 patients (2 occlusion and 1 dissection; all resulting in myocardial infarction). In 14 patients (0.6%), complications with “uncertain relation” to ICUS were recorded, including acute procedural events in 9 (5 acute occlusion, 3 dissection, and 1 arrhythmia) and major events in 5 patients (2 myocardial infarction and 3 emergency coronary artery bypass surgery). The incidence of acute procedural or major complications judged to be associated with ICUS (uncertain relation or certain relation to ICUS) was compared in different patient groups. The complication rate was higher in patients with unstable angina or acute myocardial infarction (2.1% events) as compared with patients with stable angina pectoris and asymptomatic patients (0.8% and 0.4%, respectively; $\chi^2=10.9$, $P<.01$). These complications were also more frequent in patients undergoing interventions (1.9%) as compared with transplant and nontransplant patients undergoing diagnostic ICUS imaging (0% and 0.6%, respectively; $\chi^2=13.5$, $P<.001$). Adverse events were few, and no association was detected between these events and the size or type of ICUS catheter used.

Conclusions

ICUS is associated with (but not necessarily the direct cause of) a minor acute clinical risk. Vessel spasm is the most frequent event occurring during ICUS. Other complications predominantly occur in patients with acute coronary syndromes and during guidance for intervention.

Keywords

Ultrasonics, risk factors, coronary disease