Intravascular Coronary Ultrasound (IVUS)

Before CCOHTA decides to undertake a health technology assessment, a pre-assessment of the literature is performed. Pre-assessments are based on a limited literature search; they are not extensive, systematic reviews of the literature. They are provided here as a quick guide to important, current assessment information on this topic. Readers are cautioned that the pre-assessments have not been externally peer reviewed.

Introduction

Intravascular ultrasound (IVUS), which involves the insertion of a tiny ultrasound device via a catheter is used to visualize the interior of arteries. This can provide information on the state of the artery wall, beyond that provided by angiography. IVUS has many clinical applications, but the growth of new technologies for interventional cardiology (coronary stents, balloon angioplasty, atherectomy, brachytherapy) has expanded the potential indications for its use in diagnosing and treating coronary artery disease. Recent examples of indications for IVUS include guidance for the optimal placement and deployment of stents and assessment of restenosis.1,2

Research Questions

IVUS is not a new technology, but the concern is that new interventional cardiology procedures, such as drug-eluting coronary stents, will increase its use and the costs associated with it. This increased use, however, may be offset, for example, through the improved deployment of stents and the reduced costs associated with treating restenosis.3

Assessment Process

A preliminary literature search was run on the main sources for health technology assessment (HTA) information: PubMed, The Cochrane Library (Issue 3, 2003), Centre for Reviews and Dissemination (NHS EED, DARE and HTA) and EuroScan databases. The web sites of additional HTA agencies were also searched. Internet searches were made using the Google™ search engine. The search was restricted to literature published from 1998 to date, thus earlier HTA reports, such as those by the French agency CEDIT are excluded in the summary of findings.4

Summary of Findings

Several other HTA agencies have issued reports on IVUS or have assessments underway.

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<tr>
<th>Type of Report</th>
<th>Reference</th>
<th>Findings</th>
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<td>HTA – in progress</td>
<td>Evaluation of intravascular ultrasound in diagnostic and therapeutic catheterizations – economic efficiency. Cologne, Germany: German Agency for Health Technology Assessment at the German Institute for Medical Documentation and Information; forthcoming.</td>
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<td>Study Type</td>
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<td>Meta-analysis</td>
<td>Casella, G, Klaus V, Ottani F, Siebert U, Sangiorgio P, Bracchetti D. <strong>Impact of intravascular ultrasound-guided stenting on long-term clinical outcome: a meta-analysis of available studies comparing intravascular ultrasound-guided and angiographically guided stenting.</strong> Catheter Cardiovasc Interv 2003;59(3):314-321.</td>
<td>• “IVUS-guided stenting implantation has a neutral effect on long-term death and nonfatal MI compared to an angiographic optimization. However, IVUS-guided stenting significantly lowers 6-month angiographic restenosis and target vessel revascularizations. Whether these benefits could be very helpful when dealing with lesions at high risk for restenosis is still an issue.”</td>
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• “There is some evidence that IVUS alters management of patients with angiographically indeterminate or ambiguous lesions. In other patient groups, it is reasonable to assume that if IVUS can more accurately determine the extent of lesions, then the treating physician can choose more appropriate therapy.”  
• “…There is currently insufficient evidence pertaining to the effectiveness and cost-effectiveness of intravascular ultrasound as either a diagnostic or therapeutic tool…” |
• Adequately powered randomized controlled trials (RCTs) are needed to compare long-term outcomes, with costing and cost-effectiveness studies based on these trials.  
• Horizon scanning is needed to identify future roles for IVUS and initiate RCTs of emerging applications. |
Conclusion

Interventional cardiology is developing rapidly, so assessments of IVUS published several years ago may no longer reflect the current evidence. The field may be changing too quickly to allow for a useful review at this time or the assessment of IVUS may be tied to assessments of new technologies in interventional cardiology, such as drug-eluting stents. A Canadian review of this technology concluded: “Intracoronary ultrasound has emerged as a safe and useful tool in the visualization of the coronary vasculature. Technological limitations and questions about long term safety are a concern. Its ability to overcome the inherent limitations of coronary angiography, and to guide and evaluate coronary interventions supports the notion that this technique will continue to assume an ever-expanding role in interventional cardiology.”

References
