TITLE: Iodixanol versus Iopamidol and Contrast Agent-Induced Nephropathy: A Comparison of Incidence and Review of the Guidelines

DATE: 17 October 2008

RESEARCH QUESTIONS:

1. Is there evidence that iodixanol (Visipaque™) has decreased incidence of contrast agent-induced nephropathy compared to iopamidol (Isovue™)?

2. What are the guidelines for use of iodixanol?

METHODS:
A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 3, 2008), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international health technology agencies, and a focused Internet search. Results include articles published between 2003 and October 2008, and are limited to English language publications only. No filters were applied to limit retrieval by study type for the search for question 1. Filters were applied to limit the retrieval to guidelines for the search for question 2. Internet links are provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS:

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by economic evaluations, randomized controlled trials, controlled clinical trials, observational studies, and evidence-based guidelines.

There were three systematic reviews and meta-analyses, four randomized controlled trials (RCTs), and two guidelines identified on contrast media-induced nephropathy (CIN) with the use
of iodixanol (Visipaque™) and iopamidol (Isovue™). No health technology assessments, controlled clinical trials, or observational studies were identified.

OVERALL SUMMARY OF FINDINGS:

McCullough et al. conducted a meta-analysis of patients receiving either iodixanol (isosmolar) or low-osmolar contrast media to determine the effects on nephropathy. The type of low-osmolar contrast media used was not specified so it is not clear if they used iopamidol. There were 2,727 patients with either chronic kidney disease or diabetes (or both) included from 16 RCTs. Serum creatinine increase was the main outcome measure. The patients that received iodixanol had a smaller increase in serum creatinine and less frequent CIN compared to the low-osmolar medium group.

A second meta-analysis pooled data from studies on various contrast agents and the incidence of CIN in patients with pre-existing chronic renal insufficiency. Iodixanol and iopamidol had a similar incidence of CIN in this patient population, and the authors suggested that this may be clinically relevant as iopamidol is less expensive than iodixanol.

A systematic review investigated the role of osmolality of contrast media to determine if there was an effect on CIN. RCTs included in this systematic review used iodixanol (iso-osmolality) or iopamidol (low-osmolality) in renally impaired patients. There were 17 studies and 1,365 patients included, and it was found that iodixanol and iopamidol had a similar risk of CIN. The authors concluded that osmolality does not play a role in CIN.

An RCT investigated the effects of iopamidol and iodixanol in 122 patients with diabetes undergoing angiography. Renal effects were evaluated by measuring serum creatinine at baseline and at three time points for seven days following the angiography. The study found no difference in the occurrence of CIN with patients who received iopamidol and those that received iodixanol.

The PREDICT (patients with renal impairment and diabetes undergoing computed tomography) study compared iopamidol to iodixanol in patients with diabetes and chronic kidney disease. Serum creatinine was measured in 248 patients at baseline and at 48-72 hours after the administration of the contrast media. Seven patients who received iopamidol and six patients who received iodixanol had a serum creatinine increase of 25% or more. The authors concluded that there was no difference in CIN with iopamidol versus iodixanol in patients with chronic kidney disease and diabetes.

Iopamidol and iodixanol were compared in an RCT in 414 patients with chronic kidney disease. Serum creatinine was measured at baseline and 2-5 days post-contrast media administration. The serum creatinine increases (0.5mg/dL or more) occurred in 4.4% of patients receiving iopamidol and 6.7% of patients receiving iodixanol. Serum creatinine increases of 25% or more over baseline occurred in 9.8% of patients in the iopamidol group and 12.4% of patients in the iodixanol group. The authors concluded that there was no difference in CIN between iopamidol and iodixanol.

Patients with chronic kidney disease undergoing contrast-enhanced multi-detector computed tomography were randomized to receive either iopamidol or iodixanol. Serum creatinine was measured at screening, baseline, and 48 – 72 hours after contrast media administration to
determine the occurrence of CIN. An absolute increase in serum creatinine (0.5mg/dL or more) was seen in 2.6% of patients in the iodixanol group, and no patients in the iopamidol group. A relative increase in serum creatinine (25% or greater) was seen in 4% of patients in both groups. The authors concluded that both iodixanol and iopamidol had a low risk of CIN.

The Canadian Association of Radiologists developed guidelines for the prevention of CIN. The report stated that some evidence exists to suggest that iso-osmolar contrast media may reduce CIN risk compared to high-osmolar contrast media; however, there does not appear to be any evidence about the risk of iso-osmolar compared to low-osmolar contrast media.

National Kidney Foundation guidelines for cardiovascular disease in dialysis patients recommended the use of an iso-osmolar contrast media (such as iodixanol) for evaluation of coronary artery disease. The guidelines stated that iodixanol is appropriate in patients undergoing dialysis with residual kidney function.

In summary, one meta-analysis suggested that iodixanol resulted in lower rates of CIN compared to a low-osmolar contrast medium. Overall, two systematic reviews and meta-analyses and four RCTs suggested that there is no difference in the occurrence of CIN between iopamidol and iodixanol.
REFERENCES SUMMARIZED:

Health technology assessments
No literature identified

Systematic reviews and meta-analyses


Economic analyses and cost information
No literature identified

Randomized controlled trials


Controlled clinical trials
No literature identified
Observational studies
No literature identified

Guidelines and recommendations


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APPENDIX – FURTHER INFORMATION:

Systematic reviews


Review articles


Additional references


