Outcome of open versus endovascular revascularization for chronic mesenteric ischemia: review of comparative studies

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CRD summary
The review concluded that open vascularisation was associated with significantly higher early and late symptomatic relief, lower medium-term restenosis and reintervention rates and higher postoperative morbidity and mortality and longer intensive care unit and hospital stays compared to endovascular revascularisation in patients with chronic mesenteric ischaemia. Review process and evidence limitations mean the authors’ conclusions should be treated with caution.

Authors’ objectives
To compare the efficacy and safety of open versus endovascular revascularisation for chronic mesenteric ischaemia.

Searching
PubMed was searched for publications in English; search terms were reported. Search dates were not explicitly stated; included studies were published between 1995 and 2008. The bibliography of each retrieved article was handsearched.

Study selection
Comparative studies or randomised controlled trials (RCTs) that compared open versus endovascular revascularisation for chronic mesenteric ischaemia were eligible for inclusion. Relevant outcomes were technical success, symptomatic relief, 30-day mortality and morbidity, duration of intensive care unit stay and hospital stay, restenosis and long-term survival.

The most common procedure used for open revascularisation was aortomesenteric bypass (range 63% to 100% patients) and the second most common open revascularisation procedure was transaortic endarterectomy (33% and 34% patients in two studies). There was occasional use of reimplantation of the mesenteric arteries. For endovascular revascularisation, the most common technique used was percutaneous transluminal angioplasty with stenting (range 79% to 100% patients in five studies) and percutaneous transluminal angioplasty alone in the other studies (range 47% to 100% patients). Mean age of patients ranged from 57 to 75 years. Patients in the endovascular revascularisation group were older than those in the open revascularisation group in all studies except one. Cardiac, pulmonary and renal comorbidities were more prevalent in endovascular revascularisation patients than open revascularisation patients and had been a factor influencing the choice of treatment. Follow-up, where reported, ranged from nine to 60 months in individual intervention groups; study duration ranged from three years in endovascular revascularisation groups to 20 years in one open revascularisation group.

It appeared that two independent reviewers performed study selection, but this was not reported clearly by the authors.

Assessment of study quality
No formal quality assessment was performed.

Data extraction
The numbers of events for each outcome was extracted to enable calculation of percentages for the comparative groups including the percentages of patients with early and late symptomatic relief. Median or mean lengths of stay were extracted. Significant differences between intervention groups were reported with p values. The commonest cause of mortality and morbidity for individual intervention groups was extracted.

The authors did not report how many reviewers performed data extraction.

Methods of synthesis
A narrative synthesis was provided.

**Results of the review**

Eight studies were identified (n=427, range 17 to 113): seven retrospective studies (n=398) and one prospective non-randomised study (n=29). In the retrospective studies, smaller cohorts of endovascular revascularisation patients with shorter follow-up were compared to larger cohorts of open revascularisation patients with longer follow-up. Reporting standards and techniques were non-standardised between studies.

The technical success rate of open revascularisation was 100% in six studies, 93% in one study and not reported in another. The technical success rate was higher than that for endovascular revascularisation, but for endovascular revascularisation it improved with time (30% in the oldest study and 93% to 100% in the other five studies, where reported); statistical significance was not reported.

The rate of early postoperative symptom relief (five studies) was higher for open versus endovascular revascularisation, but significantly higher in only two studies (71% versus 33%, p=0.01 and 100% versus 79%, p=0.03). The rate of late symptom relief (seven studies, follow-up one to three years) was also higher for open versus endovascular revascularisation and significantly higher in five studies (range 59% to 100% for open revascularisation and 22% to 75% for endovascular revascularisation; p=0.0004 to p=0.02).

There was no significant difference in the 30-day mortality rate between open versus endovascular revascularisation (eight studies). Major postoperative morbidity was generally higher for open versus endovascular revascularisation (eight studies) and significantly higher in three studies (33% versus 18%, p<0.01, 46% versus 19%, p=0.008 and 42% versus 4%, p=0.02). Respiratory failure was particularly common after open revascularisation. No significant differences in long-term survival were reported between open versus endovascular revascularisation (five studies).

Rates of medium-term restenosis (five studies) and reintervention (four studies) were reported to be significantly lower for open versus endovascular revascularisation in four studies. Primary graft patency was higher for open versus endovascular revascularisation at six months (one study), one year (one study, 90% versus 58%, p<0.001) and two years (one study) (significance not recorded for two studies). Similarly, secondary graft patency was higher for open versus endovascular revascularisation at two years (two studies; 87% versus 69%, p=0.003 and 100% versus 65%, p=0.006) and three years (one study, significance not reported).

Compared with endovascular revascularisation, open revascularisation was significantly associated with longer stay in the intensive care unit in three out of four studies and longer hospital stay in five out of seven studies.

**Authors’ conclusions**

In patients with chronic mesenteric ischaemia, open revascularisation was associated with greater early and late symptomatic relief and lower medium-term restenosis and reintervention rates at the expense of higher morbidity and longer intensive care unit and hospital stays.

Open revascularisation should remain the treatment of choice for chronic mesenteric ischaemia in patients deemed fit or whose fitness could be improved before surgery. Endovascular revascularisation should be considered the preferred first-line therapy for patients with a short life expectancy or considered unfit for open surgery.

**CRD commentary**

The review addressed a well-defined question in terms of participants, interventions, study design and relevant outcomes. Only one relevant database was searched and only for publications in English, which increased the risk of language bias. Unpublished studies were not considered, which increased potential for publication bias. No formal study quality assessment was performed. Most studies were retrospective comparative studies (a study design of low methodological rigour). It was not clearly reported whether any efforts were made to reduce error and bias in the review process, but it appeared that this may have applied to study selection. Some relevant study details were reported. A narrative synthesis was provided, presumably due to study heterogeneity particularly related to differences in age and comorbidities between the two treatment groups (highlighted by the authors).
Limitations in the review process and the size, quality and heterogeneity of the included studies mean that the authors’ conclusions should be treated with caution.

Implications of the review for practice and research

**Practice:** The authors stated that open revascularisation should remain the treatment of choice for chronic mesenteric ischaemia in patients deemed fit or whose fitness could be improved before surgery. Endovascular revascularisation should be considered the preferred first-line therapy for patients with a short life expectancy or considered unfit for open surgery.

**Research:** The authors identified a need for large multicentre RCTs to compare the long-term durability, efficacy and patient survival of endovascular versus open revascularisation in patients with chronic mesenteric ischaemia.

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