Keyhole surgery more effective than open surgery for ruptured aneurysm

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The use of keyhole surgery to repair ruptured abdominal aortic aneurysm is both clinically and cost effective and should be adopted more widely, concludes a randomised trial published by *The BMJ* today.

This is the first randomised trial comparing the use of keyhole (endovascular) aneurysm repair versus traditional open surgery to repair ruptured aneurysm, with full midterm follow-up.

Abdominal aortic aneurysm is a swelling of the aorta - the main blood vessel that leads away from the heart, down through the abdomen to the rest of the body. If the artery wall ruptures, the risk of death is high, and emergency surgery is needed.

Three recent European randomised trials showed that keyhole repair does not reduce the high death rate up to three months after surgery compared with open repair. However, mid-term outcomes (three months to three years) of keyhole repair are still uncertain.

So an international research team set out to assess three year clinical outcomes and cost effectiveness of a strategy of keyhole repair (whenever the shape of the aorta allows this) versus open repair for patients with suspected ruptured abdominal aortic aneurysm who were part of the IMPROVE trial.

The trial involved 613 patients from 30 vascular centres (29 in the UK, one in Canada) with a clinical diagnosis of ruptured aneurysm, of whom

316 were randomised to a strategy of keyhole repair and 297 to open repair.

Deaths were monitored for an average of 4.9 years and were similar in both groups three months after surgery. At three years, there were fewer deaths in the keyhole group than in the open repair group, leading to lower mortality (48% vs 56%). However, after seven years there was no clear difference between the groups.

The need for repeat surgery (reinterventions) related to the aneurysm occurred at a similar rate in both groups, with about 28% of each group needing at least one reintervention after three years.

Average quality of life was higher in the keyhole group in the first year, but by three years was similar across the groups. This early higher average quality of life, coupled with the lower mortality at three years, led to a gain in average quality adjusted life years or QALYs (a measure of healthy years lived) at three years in the keyhole versus the open repair group.

On average, the keyhole group also spent fewer days in hospital (14.4 versus 20.5 in the open repair group) and had lower overall costs (£16,900 versus £19,500 in the open repair group).

The researchers point to some study limitations, such as sample size and midterm data focusing on aneurysm-related events, which may have led to some bias.

Nevertheless, they say compared with open repair, "an endovascular strategy for suspected ruptured abdominal aortic aneurysm was associated with a survival advantage, a gain in QALYs, similar levels of reintervention, and reduced costs, and this strategy was cost effective."

"These findings support the increasing use of an endovascular strategy, with wider availability of emergency endovascular repair," they conclude.

In a linked editorial, Martin Björck, Professor of Vascular Surgery at Uppsala University in Sweden, says these three year results "will change clinical practice in favour of endovascular repair for patients with suspected ruptured abdominal aortic aneurysms (AAA)."

However, he points out that prevention is always better than cure - the most effective way to prevent ruptured AAA is to avoid smoking, he says, followed by early recognition and repair of aneurysms before rupture. There are still knowledge gaps to be dealt with in future studies, he concludes.

More information: Comparative clinical effectiveness and cost effectiveness of endovascular strategy v open repair for ruptured abdominal aortic aneurysm: three year results of the IMPROVE randomised trial, The *BMJ*, www.bmj.com/content/359/bmj.j4859

Editorial: Endovascular or open repair for ruptured abdominal aortic aneurysm, The *BMJ*, www.bmj.com/content/359/bmj.j5170

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