



Bitesize Research:

EVAR Surveillance

AUTHORS NAME: Isaac Colliver, University Hospitals Coventry & Warwickshire NHS Trust

PAPER 1

Smith, L. et al (2021). A Comparison of Computed Tomography Angiography and Colour Duplex Ultrasound Surveillance Post Infra-renal Endovascular Aortic Aneurysm Repair: Financial Implications and Impact of Different International Surveillance Guidelines. Eur J Vasc Endovasc Surg 62(2):193-201.

Summary

A retrospective study comparing the detection rate of computed tomography angiography (CTA) and colour duplex ultrasound surveillance (CDUS), with further estimation of the financial costs of four different surveillance protocols across a 5 year period. 309 patients had a CTA and CDUS within a four-week window and were included for agreement analysis, yielding a coefficient of 0.68 for CDUS versus CTA in detecting aortic sac abnormalities. 5-year estimated surveillance cost per patient according to each protocol was £1270 for the Society for Vascular Surgery (SVS), £1076 for the European Society of Vascular Surgery (ESVS), £3003 for the National Institute for Health Care and Excellence (NICE), and £1244 for the local protocol.

Pros

Though 8 false negatives were recorded on CDUS for the detection of type 1 and 3 endoleaks, significant sac expansion was detected on 7 of them – with the remaining 1 being a small type 1a detected on CTA that was untreated and resolved without surgical intervention. Furthermore, of the 35 false positives detected on CDUS, 33 were benign type 2 endoleaks. This is one study amongst many that suggests acceptable agreement between CDUS and CTA for the purposes of surveillance.

Cons

Single centre, retrospective study within which the local protocol meant that CTA scans were predominantly performed as a result of CDUS detecting an abnormality – confounding the accurate estimation of CDUS sensitivity and specificity. Also only included infra-renal EVARs, thus results cannot be used for inference of surveillance of complex EVARs.

Only three patient risk categories used for the financial estimate and did not include estimates for renal replacement therapy for the treatment of acute kidney injury – potentially causing an under-estimation of costs of intense CTA surveillance. Costs associated with endoleak detection (33% of patients) and re-intervention (21% of patients) were also not included.

Impact on Practice

The proportion of routine CTA to CDUS scans carries a significant cost implication and thus is an additional metric to consider when designing an EVAR surveillance program.

PAPER 2

Antoniou, GA. et al (2023). Meta-Analysis of Compliance with Endovascular Aneurysm Repair Surveillance: The EVAR Surveillance Paradox. Eur J Vasc Endovasc Surg 65(2):244-254.

Summary

Systematic review of 13 cohort studies, including 22,762 patients, comparing EVAR patients who were compliant or non-compliant with surveillance. The meta-analysis found no difference in overall survival or aneurysm-related mortality, regardless of compliance.

Pros

Large meta-analysis which found 43% of patients were non-compliant with surveillance.

Cons

The meta-analysis defined non-compliance as failure to attend at least one post-EVAR follow up, however real-world attendance can be less binary. Most of the included studies accommodated for this to some degree – e.g. allowing

up to 15 or 18 months for a surveillance visit, or creating a category for patchy compliance separate from those completely lost to follow up. Though the meta-analysis found no statistically significant difference in sub-group analysis between those completely lost to follow up and routine follow up for all cause mortality, the authors note that the subgroup of studies were very small and thus patchy compliance may have been a confounding variable on the overall outcome of the meta-analysis.

Again, the included studies were for infra-renal EVAR only – so compliance may have differing implications for complex EVARs. Eight of the thirteen studies included were deemed high risk of bias and certainty of evidence was very low. Only three studies reported on aneurysm-related mortality, which yielded no significant difference between compliant and non-compliant patients. However, the confidence interval was quite wide indicating a low precision estimate of the hazard ratio – suggesting more data is required to confidently conclude the impact of surveillance on aneurysm-related mortality.

The authors acknowledge that differences in surveillance program between studies (i.e. following the Society for Vascular Surgery's recommended yearly imaging interval – or the European Society for Vascular Surgery's repeat imaging at five years if the initial post-operative scan is satisfactory) could have also confounded the meta-analysis, though studies did not explicitly state which guideline they had adhered to.

Impact on Practice

A large percentage of patients are non-compliant with EVAR surveillance, which carries a cost implication via missed appointments. Which patients may benefit from post-EVAR surveillance is unknown, so the authors advocate for a balanced approach at this stage and to watch out for the outcome of Delphi consensus research by the International Risk Stratification in EVAR (IRIS-EVAR) working group.

PAPER 3

Karaolanis, G. et al (2022). Colour Duplex and/or Contrast-Enhanced Ultrasound Compared with Computed Tomography Angiography for Endoleak Detection after Endovascular Abdominal Aortic Aneurysm Repair: A Systematic Review and Meta-Analysis. J Clin Med 11(13):36285.

Summary

Systematic review of 38 studies, including 5214 patients, comparing the sensitivity of colour duplex ultrasound (CDUS), contrast-enhanced ultrasound (CEUS), and computed tomography angiography (CTA) in detection of endoleaks. 27 studies – including 3583 patients – provided data comparing CDUS with CTA, whilst 15 studies – including 1631 patients – compared CEUS with CTA.

Pros

Large up-to-date meta-analysis of CDUS, CEUS, and CTA's ability to detect endoleak.

Cons

Though the authors report the pooled rate of endoleak detection for each modality, they did not include meta-anal-

ysis of the sensitivity, specificity, and negative or positive predictive values.

Impact on Practice

CEUS may be the most sensitive option for the detection of endoleak, however CTA may still be preferred for confirmatory imaging where endoleak is suspected as CTA then facilitates assessment for re-intervention.

CDUS may still have adequate specificity for use as routine surveillance to exclude endoleak.

PAPER 4

Ash, J. et al (2020). LUCY results show females have equivalent outcomes to males following endovascular abdominal aortic aneurysm repair despite more complex aortic morphology. Journal of Vascular Surgery 72(1):566-575.

Summary

Prospective non-randomised study of a low-profile stent graft (Ovation, made by Endologix Inc.), comparing outcomes between females and males – to help address the deficit of endovascular devices suitable for the treatment of females with AAA. The Ovation stent was designed to be deployable in small access vessel diameters and a broad range of aortoiliac anatomy.

Pros

Largest prospective EVAR study of females conducted to date. Demonstrated comparable procedural and perioperative outcomes between sexes for the Ovation stent graft, potentially providing an additional option clinicians to treat aneurysms in female patients.



Cons

Median maximal AAA diameters were 50 ± 6 mm in females and 53 ± 10 mm in males, meaning many patients were treated before the typical surgical threshold seen in the

UK and thus may reduce the applicability of the findings in the UK.

Only followed up to 1 year at this point, with low sample size, therefore minimal inference can or will be made for

long-term durability of the Ovation stent graft in females versus males.

Impact on Practice

Highlights the deficit in options for EVAR in female patients. +



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The Specialist Vein Care clinic in Dunedin, New Zealand is looking for a part time / full time vascular sonographer.

This is a one-year sabbatical and an exciting opportunity for one fortunate individual (pioneer) wishing to experience the incredible outdoor opportunities of Southern Otago and the wider South Island. This includes but is not limited to the amazing Cycle trails of Central Otago, the excitement of Queenstown, the beauty of the Abel Tasman and the serenity and fortitude of Fiordland.

The Specialist Vein Clinic is teaming up with Dunedin Hospital and the University of Central Otago to create a one-year Sabbatical position. We foresee a long lasting and synergistic collaboration which will benefit both employees and employers alike.

To discuss this amazing opportunity, please contact myself at the email address below for further information.

Pete Laws @ Petelaws88@gmail.com