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Endovascular versus open repair of ruptured abdominal aortic aneurysm

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ABSTRACT

Introduction: Endovascular aneurysm repair (EVAR) is a comparatively less invasive technique than open repair (OR). Debate remains with regard to the benefit of EVAR for patients with ruptured abdominal aortic aneurysm (RAAA). We sought to evaluate and report outcomes of EVAR for RAAA in an Irish tertiary vascular referral centre.

Methods: Patients undergoing emergency surgery for ruptured or symptomatic AAA were identified from theatre logbooks and HIPE database. Retrospective chart review was undertaken. Data were exported to IBM SPSS version 21 for statistical analysis with $p < 0.05$ considered significant.

Results: A total of 41 patients underwent surgery for RAAA. The mean age was 74 years old with a range from 55 to 89 years. The majority (n = 25, 61%) were baseline American Society of Anaesthesiology (ASA) grade 3–4. Of these 56% underwent EVAR with the remaining 44% repaired open. Mortality rate in those undergoing emergency EVAR was 34.8%, compared with 38.9% in those undergoing open surgery. This difference was not statistically significant. The mean overall length of stay was 13 days. With regard to prognostic indicators of patient outcome, increasing patient age was noted to be significantly associated with increased mortality ($p = 0.013$), as was increased ASA score at time of surgery ($p = 0.029$).

Conclusions: Mortality rates in those undergoing EVAR for RAAA are comparable with those undergoing open repair. Increasing age and ASA score are significant predictors of mortality in patients with RAAA undergoing intervention.

Introduction

Despite advances in operative technique and peri-operative management ruptured abdominal aortic aneurysm (RAAA) repair carries a high rate of death and complications. Endovascular aneurysm repair (EVAR) is a comparatively less invasive technique than OR. The EVAR-1 trial in 2005 noted a significant decrease in aneurysm related death in patients undergoing EVAR compared with OR (4%vs 7%; $p = 0.04$).[1] These patients were scheduled electively however, and debate remains with regard to definitive benefit in EVAR for patients with RAAA.

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Most recently the IMPROVE trial noted a 30 day mortality of 24.7% for RAAA treated with EVAR, which was not significantly better than patients undergoing open surgery.[2] Other recent publications have reported a high variability in mortality rate of up to 53% in patients undergoing EVAR for RAAA.[3,4] We sought to evaluate and report outcomes of EVAR for RAAA in an Irish tertiary vascular referral centre.

Methods

The study was carried out between March 2008 and December 2012 in Beaumont Hospital. Beaumont hospital is a tertiary vascular referral centre located in North Dublin with a vascular surgery catchment area of 1.3 million. In 2008 we established a ruptured AAA EVAR protocol. This entailed considering all RAAA for EVAR when physiologically and anatomically possible. Our EVAR protocol centred upon the three areas of the RAAA patient journey: the Emergency Department, Radiology Department and operating theatre [Fig. 1]. This involved vascular surgeons, anaesthetics, operating room staff, radiographers and the availability of a variety of stent-graft sizes and types, and an operating room that was adequately equipped with a mobile Siemens© C-arm (www.healthcare.siemens.com) to perform endovascular intervention and open repair. The repair was carried out by one of four consultant vascular surgeons. Endovascular repair was performed by deploying either bifurcated or aorto uni iliac (AUI) stent grafts from Medtronic, Inc.© (www.medtronic.com).

Patients who underwent emergency AAA surgery for rupture or symptomatic AAA were identified from theatre logbooks and HIPE database. Retrospective chart review was undertaken. Patient demographics, intra-operative details and post-operative outcomes were recorded on a standardised proforma. Data were exported to IBM SPSS version 21. Both Chi squared analysis and Independent sample T test were used to compare open and endovascular groups, with $p < 0.05$ considered statistically significant.

Results

A total of 54 patients underwent emergency surgery AAA during the time period. This included 13 patients with symptomatic AAA without radiological evidence of rupture. These 13 patients were excluded from analysis. The remaining 41 patients underwent surgery for RAAA. Of these 41 patients 23 (56%) underwent EVAR with the remaining 18 (44%) repaired open. With regards to the endovascular stent deployed, the majority (n = 19, 82%) had an AUI placed with the remaining 4 (18%) having a bifurcated stent graft. The mean age was 74 years old with a range from 55 to 89 years. With no significant differences in age between the EVAR and OR cohorts. Of these 18 (44%) were male and the remainder (n = 23, 56%) female. The majority (n = 25, 61%) were American Society of Anaesthesiology (ASA) grade 3–4. The mean overall length of stay was 13 days. The majority (n = 33, 80.5%) were transferred from other hospitals. The mean transport distance was 81 km (range 15–233). Mean follow up overall post discharge was 21 months (range 1–55 months).

Overall mortality rate in those undergoing emergency EVAR was 34.8% (n = 8/23), compared with 38.9% (n = 7/18) in those undergoing open surgery. This difference was not statistically significant (p = 0.786).

Excluding inpatient mortalities length of stay (LOS) in the EVAR was 13.7 days compared with 12 days in the open group

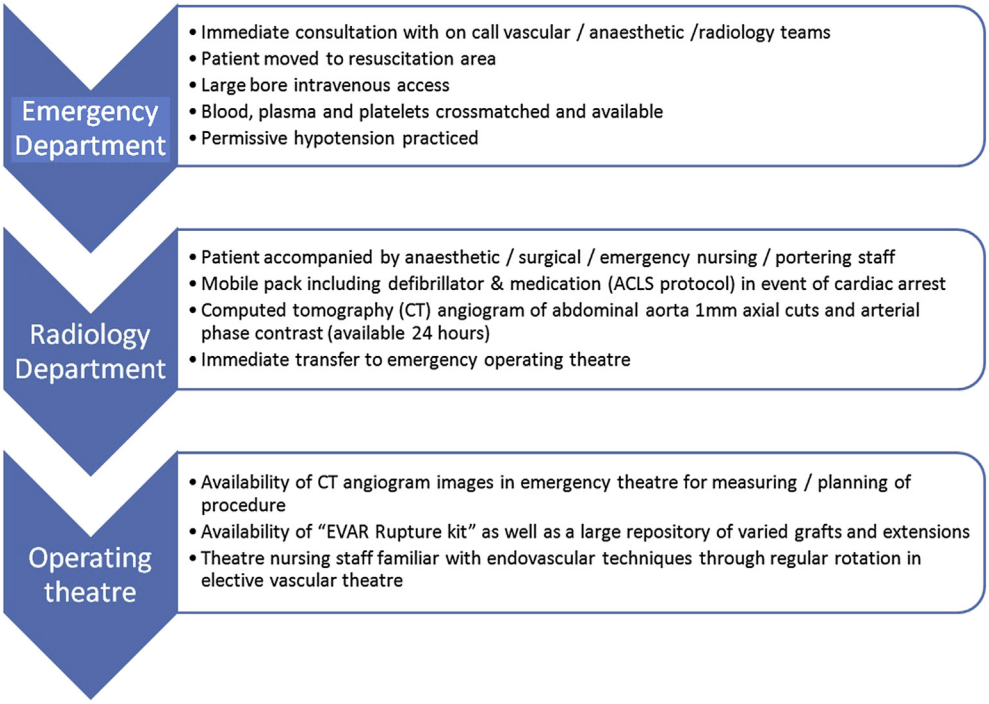

Fig. 1 – Key point summary of Inter-departmental Ruptured EVAR Protocol.