Calcium Channel Blockers enhance sac shrinkage following Endovascular Abdominal Aortic Aneurysm Repair (EVAR)

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Introduction

Matrix metalloproteinases (MMPs) play a critical role in abdominal aortic aneurysm (AAA) development, rupture and remodelling following EVAR. Statins, angiotensin converting enzyme inhibitors (ACEi) and Calcium Channel Blockers (CCB) beneficially modulate MMPs in-vitro and may attenuate AAA growth. Little work has been undertaken on the effects of these drugs on sac shrinkage following EVAR.

Methods

We retrospectively reviewed all patients undergoing EVAR at our institution (2005-2008) collecting data on patient demographics, risk scores, medications on admission, mortality, sac size (maximal antero-posterior and transverse diameters) and endoleak development. Sac shrinkage was measured by calculating the percentage change in maximal cross sectional area (using the formula $\pi ab$) from pre-operative imaging at 1 month, 6 months, 1 year and 2 years. Sac shrinkage was compared in subgroups stratified by statin, ACEi and CCB use. Results are presented as median(IQR).

Results

Only CCBs produced significant improvements in sac shrinkage; statins and ACEi had no effect. Of 112 patients available for analysis, 89% were men, median age 78(73-83). There were 21 patients in the CCB group and 91 controls. Groups were well matched for age, sex, Glasgow Aneurysm Score, American Society of Anaesthesiologists’ Score and endograft type. Initial AAA size was 62(58.5-71.5)mm in the CCB group and 62(57-70)mm in controls. The mean (95%CI) difference in percentage sac size reduction (figure 1) was 6.6% (-3.0% to 16.3%, p 0.17) at 6 months, 10.3% (1.3% to 19.3%, p 0.026) at 1 year and 22.5% (9.2% to 35.8%, p 0.003) at 2 years, with little change after correction for confounders. There was no significant difference in endoleak development or mortality, which was 1.8% at 30 days.

Conclusion

Patients taking a CCB have significantly improved sac shrinkage up to two years following EVAR compared to patients not taking a CCB. This data supports use of CCBs following EVAR, but further prospective studies are required.
Figure 1: Mean percentage sac size reduction 1 month, 6 months, 1 year and 2 years following EVAR for patients taking calcium channel blockers (CCB group) and patients not taking CCBs (control group). Error bars represent the standard error of the mean. Statistical significance: * $p = <0.05$ and ** $p = <0.01$ on t-test.