

THE INFLUENCE OF TOURNIQUET TIME ON CEREBRAL EMBOLIC EVENTS IN ELDERLY PATIENTS UNDERGOING TOTAL KNEE ARTHROPLASTY

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Introduction

Elderly patients undergoing major, orthopedic surgery are at high risk of developing postoperative cognitive dysfunction. Transcranial doppler monitoring of blood flow to the brain has detected cerebral in 60% of patients following release of the thigh tourniquet during total knee arthroplasty (TKA). These cerebral embolic events may represent one of the mechanisms responsible for postoperative cognitive problems. Research using transesophageal echocardiography monitoring of venous blood flow into the heart during TKA has demonstrated that the amount of systemic and pulmonary emboli detected following tourniquet release increases as the duration of tourniquet inflation increases. Current surgical practice is to use a thigh tourniquet for the entire TKA procedure to decrease bleeding, however, minimal tourniquet techniques are used in patients at risk for deep vein thrombosis.

This prospective protocol randomized elderly patients to either a minimal or a standard tourniquet technique during TKA to determine if the duration of tourniquet inflation correlates with the incidence of cerebral emboli and postoperative cognitive dysfunction. The study seeks to confirm the hypothesis that patients undergoing TKA with a minimal tourniquet technique will have fewer cerebral embolic events and a better cognitive outcome than those undergoing TKA with standard tourniquet techniques.

Experimental

To evaluate this hypothesis, the research plan contains pre- and post-surgical **MRI** evaluation using the 3T MR head scanner. Each MRI evaluation focuses on diffusion and perfusion sequences (EPI perfusion: TR=2050 msec, TE=35msec, FA=90, FOV=230, Slice thickness=5mm, Gap=20%) to demonstrate acute to early subacute infarctions, diffusion tensor imaging for detection of changes in white matter tract integrity and spectroscopy to evaluate shift of metabolites. The MRI findings will be correlated to the postoperative neurocognitive function and type of surgical intervention.

Results and Discussion

To date, 22 participants have obtained pre and post-surgery scans. Five of these 22 patients exhibited incidence of infarction on studies performed a few days following TKA. There was no difference in stroke outcome relative to tourniquet technique. The relationship between cognitive function and surgical intervention is still being analyzed.

Conclusions

Embolitic events occur with non-cardiac surgery and this does not appear to depend on length of tourniquet time. Currently, we are unable to comment on whether a full or minimal tourniquet influences post-operative cognitive.

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