FUNCTIONAL IMPACT OF LYMPHANGIOGENESIS ON FLUID TRANSPORT AFTER LYMPH NODE EXCISION

C. Kim, B. Li, C. Papaiconomou, A. Zakharov, M. Johnston

Neuroscience Research, Department of Laboratory Medicine and Pathobiology, Sunnybrook and Women’s College Health Sciences Centre, University of Toronto, Ontario, Canada

ABSTRACT

When a lymph node is excised, lymphangiogenesis occurs to maintain flow in the affected area. However, a complex network of small vessels replaces the node and these newly formed vessels might increase resistance to lymph transport. To test this in sheep, the popliteal lymph node from one hind limb was removed surgically. The contralateral node was left intact. After 4 to 6 weeks (a period that allowed regenerated vessels to restore flow), a prenodal lymphatic vessel in each limb was cannulated with a polyethylene catheter to permit saline infusion into the node or lymphatic regeneration site. Infusion pressures were monitored from t-pieces inserted between the infusion pump and the point of entry of the catheters in the prenodal ducts. We observed that the flow rate versus perfusion pressure relationships were significantly different in the 2 experimental preparations (node intact limbs, n=13; node excised limbs, n=10). In the limbs undergoing lymphangiogenesis, much higher infusion pressures were required to generate a given flow rate. Additionally, the regenerated lymphatic network provided a significantly increased resistance to flow. The data suggested that lymphangiogenesis restored fluid continuity to some extent in the area occupied originally by the popliteal lymph node. However, the transport properties exhibited by the newly formed lymphatics were insufficient to restore flow parameters to their original state.