Economic Comparison of Hand-Sutured and Coupler-Assisted Microvascular Anastomoses

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INTRODUCTION: Surgical outcomes associated with the use of microvascular anastomotic coupling devices (MACD) are well reported in the literature – compared with hand-sutured anastomoses, MACDs confer equivalent flap survival[1,2] with reduced operative time.[3,4] The purpose of this study was to assess the economics of a hand-sutured anastomosis compared with a coupler-assisted anastomosis. Following up on our previous study that focused on the economics in a Canadian context,[5] we expanded the scope of our research to include the American market.

MATERIALS AND METHODS: Economics were analyzed for a free flap requiring a single venous anastomosis carried out with either a hand-sutured anastomosis or with a coupler-assisted anastomosis using the GEM COUPLER (Synovis Micro Companies Alliance Incorporated; Birmingham, Alabama). All fixed and variable costs incurred with each respective anastomotic technique were identified with an activity-based cost analysis – relevant economic variables included disposable costs (e.g. coupler ring, suture), capital expenditure of the device, and both fixed and variable operating room (OR) costs (e.g. overhead, labor). Supplier and manufacturer price lists were used to quantify disposable costs and capital expenditures. Two separate literature reviews were carried out to identify microsurgical OR costs and operating time reductions observed with coupler-assisted anastomoses. Historically reported costs were converted to present day values using the United States Medical Care Inflation Rate. The total savings per use and the number of uses required to offset the coupler device's capital expenditure were calculated.

RESULTS: For each venous anastomosis use of the anastomotic coupler increased disposable costs by $284.40 compared with a hand-sutured anastomosis (cost of coupler ring less savings from unused suture). Total fixed and variable OR costs (includes overhead, labor, supplies, excludes physicians fees) were $30.82 per minute. Operating time was reduced by a mean of 16.9 minutes with a coupler-assisted anastomosis, decreasing OR costs by $519.29. Total savings of $234.89 were generated for each coupler-assisted anastomosis, recuperating the device's capital expenditure after 13 uses.

CONCLUSION: Despite higher disposable costs, reduced operative time allows the anastomotic coupler to generate savings compared with hand-sutured anastomoses. Despite its limitations and simplicity, this study provides a practical economic analysis of the microvascular anastomotic coupler that can help inform purchasing decisions, particularly for smaller volume centers where the economic rationale may be less clear.

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