Physician - Heart Failure, Transplantation and Mechanical Support Systems

[MEP-11]

Replantation of Traumatic Limb Loss: A Case Report of Multidisciplinary Approach with Cardiopulmonary Bypass Technique for Ischemic Perfusion

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Reimplanting a traumatically amputated limb requires minimal ischemia duration with adequate perfusion at low temperatures. Cardiopulmonary bypass (CPB) techniques play a significant role in the limb salvage algorithm in reducing ischemia time, allowing planning, and preventing reperfusion injury. A 23-year-old female was admitted to the emergency department due to a traffic accident. The right arm at the shoulder and the left arm at the elbow were amputated. The patient was initially taken into surgery due to injuries to the liver and spleen. During this process, a CPB circuit was used to perfuse the amputated limb.

The total cold ischemia time of the limbs was 90 min. The right arm's brachial and the left arm's radial arteries were used for arterial cannulation. A 10-Fr arterial cannula was placed in the left brachial artery. The right radial artery was cannulated with a 20-gauge branula and connected to the arterial cannula via a vascular line. The limbs were placed in a sterile container at an angle of 20°C. The venous flow was first accumulated and then returned to the CPB circuit using a sucker. Since the weights of the amputated limbs were unknown, appropriate cannula sizes and flow rates were determined using the rule of nine. The weight was calculated as 2 kg, and the surface area as 0.12 m^2. Tissues were perfused at 25°C for 224 min with a maximum flow rate of 288 mL/min. After CPB, replantation of both amputated limbs was performed by plastic surgery. The right arm was demarcated, and a secondary amputation was made on the 21st postoperative day. The left arm was consistent with positive findings in the motor and sensory examinations approximately six months later.

Figure 1. Appearance of the replanted forearms before amputation.

Figure 2. Cardiopulmonary bypass circuit is perfusing the amputated forearm.

Complex limb salvage procedures require a multidisciplinary approach. Cardiopulmonary bypass plays a critical role in the algorithm in prolonging the critical period of ischemia, facilitating replantation planning, and preventing reperfusion injury.

Keywords: Cardiopulmonary bypass, noncardiac surgery, perfusion, replantation.

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