ANESTHESIA FOR TRANSMYOCARDIAL REVASCULARIZATION WITH AUTOLOGOUS BONE MARROW STEM CELL TRANSPLANTATION.

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Transmyocardial revascularization with stem cell transplantation is an alternative treatment option for patients with refractory angina who are not suitable candidates for more conventional coronary intervention or surgery. It is done by creating transmyocardial channels that provide blood flow from the left ventricular chamber to areas of ischemic myocardium.

Patient Selection

TMLR is an approved procedure for patients who have stable, refractory angina and are not suitable candidates for any other more traditional revascularization procedure.

Anesthesia consideration

The TMLR procedure is performed under general anesthesia. The patient is intubated with a double lumen endotracheal tube, which allows for single lung ventilation. A central venous line and an arterial line are placed for pressure monitoring. This procedure is performed on a beating heart, so there is no need for cardiopulmonary bypass. The laser is synchronized with the R wave of the patient's ECG in order to fire when the myocardium is most refractory and the left ventricle is most full. This timing serves a twofold purpose: it reduces the risk of causing life threatening arrhythmias during the procedure and the blood in the ventricle adequately dissipates the laser energy, preventing it from passing through to other adjacent areas. Closer attention must be paid to timing, when using a laser that requires multiple bursts or firings to create a channel, in order to decrease the risk of inducing arrhythmias.

Transesophageal echocardiography (TEE) is used with the high powered CO₂ laser to confirm the penetration of the ventricular tissue and channel creation. Because the laser pulse is delivered in short bursts of low energy, the beam does not penetrate. The procedure is completed when the ischemic area has been adequately revascularized. The incision is closed in routine fashion and a chest tube is inserted.

Considerations for P.O Care

Pain management is a critical concern in patients that need to perform aggressive pulmonary exercises with a thoracotomy incision. The most common method of pain control is patient controlled analgesia (PCA) narcotics in combination with nonsteroidal anti-inflammatory drugs.

Conclusion:

TMLR provides a safe and effective alternative for patients with refractory angina. The short term and long term results have been positive. Patients are able to return to a more active lifestyle and report a significantly improved quality of life. TMLR has not replaced...
traditional methods of revascularization, but it provides a credible option to those who have reached the end stages of coronary disease. Further improvements in technology and an improved understanding of the mechanisms of action will provide information or the continued refinement and application of the TMLR procedure.