Public Statement:

The maze procedure is covered for drug resistant atrial fibrillation or flutter. This procedure is subject to review.

Percutaneous catheter ablation procedures are discussed under policy ARB008.
Medical Policy Statement:

The maze procedure is considered medically necessary and is covered for patients with atrial fibrillation or flutter who:

1) Fail or are unable to tolerate medical therapy; AND

2) Are not candidates for percutaneous catheter ablation.

Background:

The maze procedure is the surgical treatment of atrial fibrillation for patients who do not respond to medical or other surgical antiarrhythmic therapies. This procedure involves sequential atriotomy incisions that interrupt potential re-entrant circuits to restore the normal atrial pacemaker complex and allow activation of the entire atrial myocardium to preserve atrial transport function.

The maze procedure entails making incisions in the heart that:

- Direct an impulse from the sinoatrial (SA) node to the atrioventricular (AV) node;
- Preserve activation of the entire atrial myocardium; and
- Block re-entrant impulses that are responsible for atrial fibrillation (AF) or atrial flutter (AFI).

Atrial fibrillation is a supraventricular tachyarrhythmia, characterized by disorganized atrial activation with ineffective atrial ejection. The underlying mechanism of AF involves interplay between electrical triggering events and the myocardial substrate that permits propagation and maintenance of the aberrant electrical circuit. The most common focal trigger of AF appears to be located within the cardiac muscle that extends into the pulmonary veins. The atria are frequently abnormal in patients with AF and demonstrate enlargement or increased conduction time. Atrial flutter is a variant of atrial fibrillation.

The classic Cox maze procedure is performed on a non-beating heart during cardiopulmonary bypass. Simplification of the maze procedure has evolved with the use of different ablation tools such as microwave, cryotherapy, ultrasound, and radiofrequency energy sources to create the atrial lesions instead of employing the incisional technique used in the classic maze procedure.

In addition, less invasive, trans-thoracic, endoscopic, off-pump procedures to treat drug-resistant AF are being developed and evaluated.
Khargi and colleagues analyzed 48 studies comprising 3,832 patients who received surgical treatment of atrial fibrillation using the classic “cut and sew” Cox-maze III technique or an alternative source of energy. They concluded that they could not identify any significant differences in the postoperative sinus rhythm conversion rates between the classical approach and alternative sources of energy. While prospective randomized studies are lacking, the data involve a wide range of ablative patterns and their effects on atrial tissue. Topkara and colleagues reported comparable postoperative rhythm success in use of either radiofrequency (121 patients) or microwave (85 patients) energy in surgical ablation of atrial fibrillation.

Reston and colleagues reviewed 4 randomized controlled trials and 6 comparative studies to determine whether a simultaneous maze procedure reduces the risk of stroke or death in patients with chronic or paroxysmal atrial fibrillation who receive mitral valve surgery. They concluded that the studies support a reduction in stroke rates and a small increased risk in need for pacemakers among patients receiving simultaneous maze procedures. Alternative energy sources, such as radiofrequency, may reduce the risk of postoperative bleeding associated with classic maze incisions.

Several observational studies compared the Cox-Maze III procedure with other procedures (radiofrequency ablation, pulmonary vein isolation) performed at single institutions, with procedure selection guided by the surgeon. Two studies attempted to address the selection bias inherent in these studies by matching. In the first from the Washington University School of Medicine, where the maze procedure was developed, the 242 patients who underwent the Cox-maze procedure (154 with the classic cut and sew (CMIII) procedure, and 88 where radiofrequency ablation replaced the incisions of the classic procedure (CMIV)) were matched on their propensity for treatment assignment (a logistic regression where the outcome is treatment assignment and the predictors are covariates that might influence which procedure is chosen by the surgeon). (Lall et al, 2007) Fifty-eight matched pairs were studied. At one year, survival was 94% and 89% (p=0.19) and freedom from AF recurrence was 96% and 93% (p=0.52) for the CMIII and CMIV groups, respectively. The authors note that the CMIV procedure was offered to higher risk patients than the CMIII procedure, which is partly why only 58 of 88 CMIV patients were able to be matched in their analysis. The matched propensity analysis is able to remove measurable selection biases, but if unmeasured factors lead surgeons to choose one surgery over the other, these factors are not accounted for in the analysis. In a second matched analysis, 56 patients who underwent a CMIV radiofrequency ablation procedure at the Mayo Clinic were matched (historical controls) to 56 patients who underwent the CMIII procedure. (Stulak et al, 2007) Matching factors were age, gender, NYHA class, AF type, and concomitant mitral valve surgery. Here the CMIV group had greater postoperative AF (43% vs. 24%), more pacemaker requirements (25% vs 5%), more antiarrhythmic drug use (75% vs. 25%), and fewer patients with freedom from AF at late follow-up (mean 8.4 months) (62% vs. 92%). Again the CMIV patients had greater underlying disease (more concomitant procedures were performed).

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References:


Kubac G, Malowany L.(1992) Functional capacity of patients with atrial fibrillation and


Application to Products

This policy applies to ARBenefits. Consult ARBenefits Summary Plan Description (SPD) for additional information.

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