Nerve Graft in Association with Radical Prostatectomy

**Description**

Nerve grafting to replace cavernous nerves resected at the time of radical prostatectomy is proposed to reduce the risk of erectile dysfunction after this surgery. The sural nerve is most commonly used in grafting.

**Background**

Erectile dysfunction is a common problem after radical prostatectomy. In particular, spontaneous erections are usually absent in patients whose extent of prostate cancer requires bilateral resection of the neurovascular bundles as part of the radical prostatectomy procedure. A variety of noninvasive treatments are available, including vacuum constriction devices and intracavernosal injection therapy. However, spontaneous erectile activity is preferred by patients. Studies have reported results from bilateral nerve grafts; there are also reports of unilateral grafts when only one neurovascular bundle has been resected.

There has been interest in sural nerve grafting to replace cavernous nerves resected at the time of prostatectomy. The sural nerve is considered expendable and has been used extensively in other nerve grafting procedures, such as brachial plexus and peripheral nerve injuries. As applied to prostatectomy, a portion of the sural nerve is harvested from one leg and then anastomosed to the divided ends of the cavernous nerve. Reports are also being published using other nerves, such as the genitofemoral nerve.

**Regulatory Status**

As sural nerve transplant is a procedure, it is not subject to FDA regulation.

**Related Policies**

None
**Policy**
*This policy statement applies to clinical review performed for pre-service (Prior Approval, Precertification, Advanced Benefit Determination, etc.) and/or post-service claims.*

Unilateral or bilateral nerve graft is considered **not medically necessary** in patients who have undergone resection of one or both neurovascular bundles as part of a radical prostatectomy.

**Rationale**

The first randomized controlled trial (RCT) that evaluated nerve grafting was published in 2009 by Davis and colleagues. (1) Eligibility criteria included age 65 or younger, normal self-report baseline erectile functions, and scheduled for a unilateral nerve-sparing radical prostatectomy with preservation of one neurovascular bundle. All patients had the other neurovascular bundle removed, and patients were randomly assigned to receive or not receive sural nerve grafting after its removal. The primary outcome was potency 2 years post-surgery, defined as the ability to have intercourse with or without erectile dysfunction medication. The investigators estimated that the control group would have a 40% potency rate and powered the study to detect an absolute difference of 20% between groups. All patients received the same early erectile dysfunction therapy including medication and mechanical devices. A sample size of 200 was originally planned to provide 80% power. However, after 107 patients were randomly assigned, a pre-planned interim analysis of evaluable patients found similar rates of potency in the two groups; the Data Monitoring Committee estimated that there was less than a 5% chance that there would be a significant difference between groups with additional recruitment and the trial was stopped early. When data collection ended, endpoint data were available for 66 patients who had either achieved potency or had been followed up for 2 years without potency. Potency was achieved in 32 of 45 (71%) sural nerve graft patients and 14 of 21 (67%) control patients *(p=0.78)*. The authors concluded that unilateral sural nerve graft did not result in an absolute improvement of 20% in the rate of potency but that a smaller effect cannot be ruled out. A limitation of the study was that it was non-blinded, which could have impacted self-report of potency.

Other than the Davis et al. study, the published literature consists of case series described below.

In 2007, Namiki and colleagues published a series in Japan with 3-year follow-up.(2) A total of 113 patients were evaluated: 19 patients with unilateral nerve sparing plus sural nerve graft, 60 patients with unilateral nerve sparing but no grafting, and 34 patients with bilateral nerve-sparing surgery. Sexual function was assessed with validated questionnaires, and at 2 years there was no difference between the nerve-grafted and the bilateral nerve-sparing patients with regard to sexual function scores. At 3 years, 25% and 28% of patients in the nerve-grafted and bilateral nerve-sparing groups, respectively, considered their sexual function as fair or good. Urinary function returned to baseline in the nerve-grafted and bilateral nerve-sparing groups at 6 months and in the unilateral nerve-sparing group at 12 months. Differences in sexual function were present at baseline with the nerve-grafted and bilateral nerve-sparing patients reporting higher baseline function than the unilateral nerve-sparing group.

A 2010 case series reviewed the records of 131 men who had unilateral nerve grafts after radical prostatectomy with unilateral neurovascular bundle resection.3 Men who had prior radiotherapy or...
hormonal treatment were excluded. Another eligibility criterion was satisfactory erections presurgery as assessed by a 5-point scale (1=full erections; 2=diminished erections, but routinely sufficient for sexual intercourse; 3=partial erections occasionally satisfactory for intercourse; 4=partial erections unsatisfactory for intercourse; and 5=no erections). A total of 49 men received sural nerve grafts, 79 received genitofemoral nerve grafts, and 3 received ilioinguinal nerve grafts. Recovery of erections was evaluated at each follow-up visit according to the 5-point scale (also called 5 levels). The median patient age was 58.7 years, and the median follow-up was 37 months. According to actuarial analysis, the 5-year probability of recovering erections of level 3 or better was 46%. The probability of recovering erections of at least level 2 or level 1 was 34% and 12%, respectively.

In 2014, Siddiqui et al reported 3-year follow-up on 66 men with clinically localized prostate cancer who had undergone sural nerve grafting during radical retropubic prostatectomy.4 Forty-three (65%) were unilateral nerve grafts, and 23 (36%) were bilateral. All procedures were performed by a single surgeon. Recovery of potency was defined as a postoperative International Inventory of Erectile Function (IIEF) score greater than 22. Patients were permitted to use phosphodiesterase type 5 inhibitors) for erectile dysfunction. The mean preoperative IIEF score was 23.4 (SD 1.6), and postoperatively, 19 patients (28.8%) recovered potency ie, had an IIEF score greater than 22. When stratified by graft type, erectile function recovery rates were 28% after unilateral and 30% after bilateral nerve grafting.

Ongoing Clinical Trials

Nerve Grafting With an Allograft During Radical Prostatectomy - Extended Follow-up in a Prospective Randomized Trial (NCT01770340) (5): This single-blind study includes 60 patients with prostate cancer. Patients have been randomized to receive radical prostatectomy with or without implantation of an allogenic nerve graft. The primary outcome is erectile function and follow-up is at least 24 months post-surgery. The expected date of final data collection is January 2014. In October 2014, the website still lists the expected date of final data collection as January 2014.

Practice Guidelines and Position Statements

The 2013 (V.4) National Comprehensive Care Network (NCCN) prostate cancer guidelines states that replacement of resected nerves has not been shown to be beneficial for recovery of erectile function after radical prostatectomy. (8)

Summary

Nerve-grafting, most commonly using the sural nerve, at the time of radical prostatectomy has been proposed to reduce the risk of postoperative erectile dysfunction. Only one randomized controlled trial that evaluated sural nerve grafting with radical prostatectomy has been published, and this study did not find that unilateral sural nerve grafting was associated with a statistically significant improvement in potency rates 2 years post-surgery. Due to the negative findings of this study, and the lack of other controlled studies evaluating unilateral or bilateral nerve grafting, the technique is considered not medically necessary.
Medicare National Coverage

No national coverage determination.

References


Policy History

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<tr>
<td>March 2013</td>
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**Keywords**

- Genitofemoral Nerve Graft, Prostatectomy
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This policy was approved by the FEP® Pharmacy and Medical Policy Committee on March 20, 2015 and is effective April 15, 2015.

Signature on file

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