

Erectile function restoration post-radical prostatectomy: Utilisation of a new novel nerve grafting procedure

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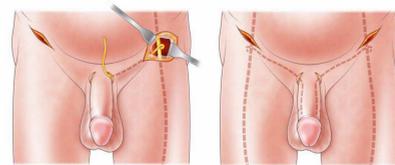
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Introduction

- Long term survival for men after prostate cancer treatment has seen increased focus on the importance of patient survivorship and quality of life (QoL)
- Approximately 70% of men suffer permanent erectile dysfunction (ED) following radical prostatectomy (RP).(1)
- ED can significantly impact on general QoL and health-related quality of life (HRQoL)
- Treatment modalities for ED unresponsive to PDE5is are limited:
 - Intracorporal injections are often associated with high dropout rates, pain, haematoma, fibrosis and more rarely, priapism.(2)
 - Surgically-invasive penile prostheses are associated with 13%-17% adverse complications including infections, malpositions and malfunctions.(3,4)
- In March 2017, Souza Trindade et al. reported a minimally invasive penile reinnervation surgical technique that successfully restored erectile function in 6 out of 10 impotent men 2 years after nerve sparing radical prostatectomy.(5)
- **We report the outcomes of our completely novel penile reinnervation surgical technique using somatic to autonomic end-to-side nerve bridges from the femoral nerve to restore erectile function and improve HRQoL in men with permanent ED after nerve- and non-nerve sparing radical prostatectomy**

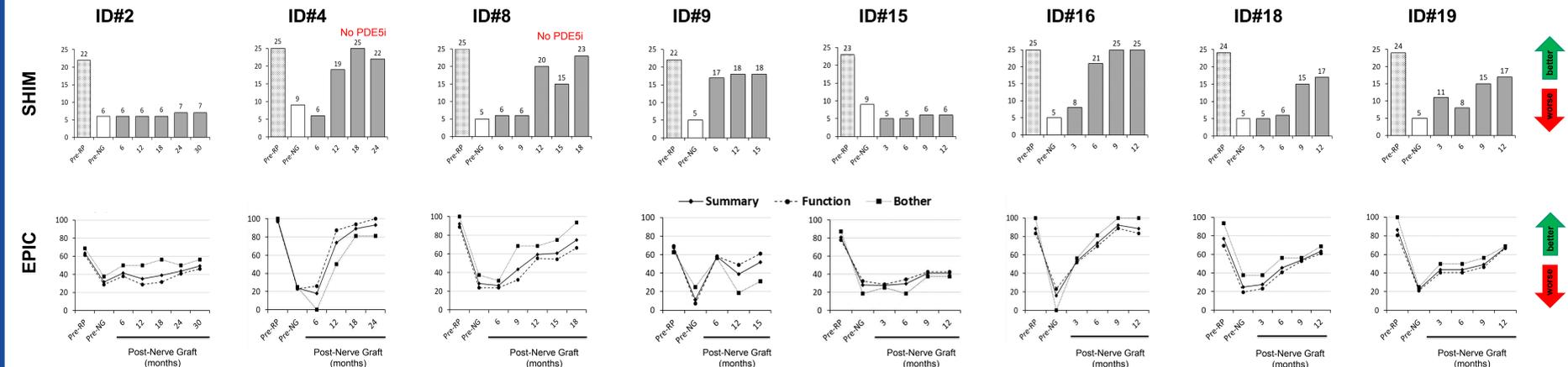
Novel surgical technique

- o The novel somatic to autonomic nerve bridge surgical technique involves minimally invasive harvesting of both sural nerves.
- o Sural nerves are used as end to side nerve grafts from both femoral nerves to bilaterally reinnervate the corpora cavernosa of the penis.
- o Nerve bridges are sutured to the femoral nerve utilizing appropriate microsurgical techniques.
- o Surgery is performed in ~2.5 hours
- o Patients are discharged after an overnight stay in hospital

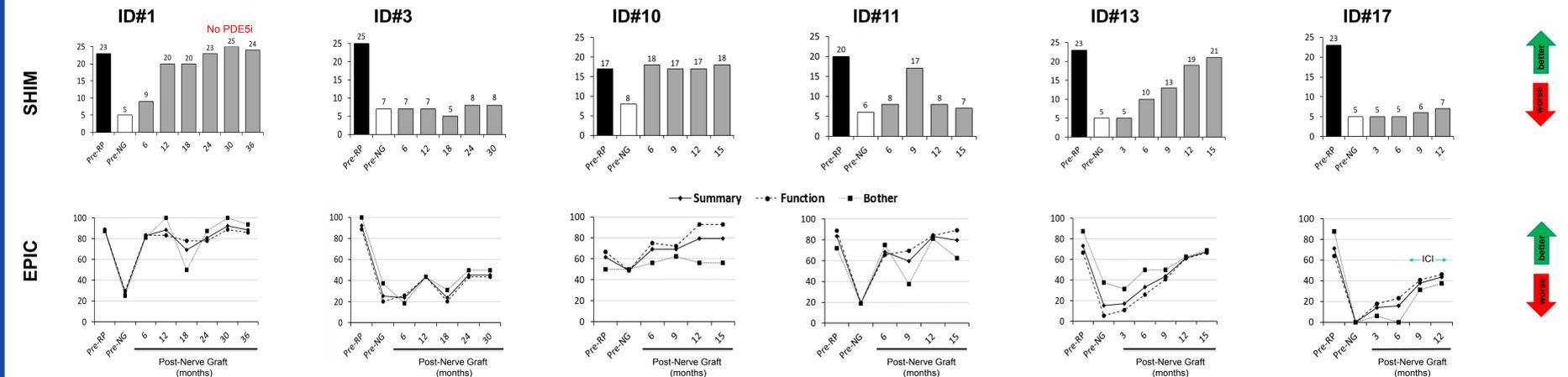


Patient reported outcomes: Erectile Function (IIEF-5) and Sexual Quality of Life (sexual domain of EPIC) following novel nerve graft surgery

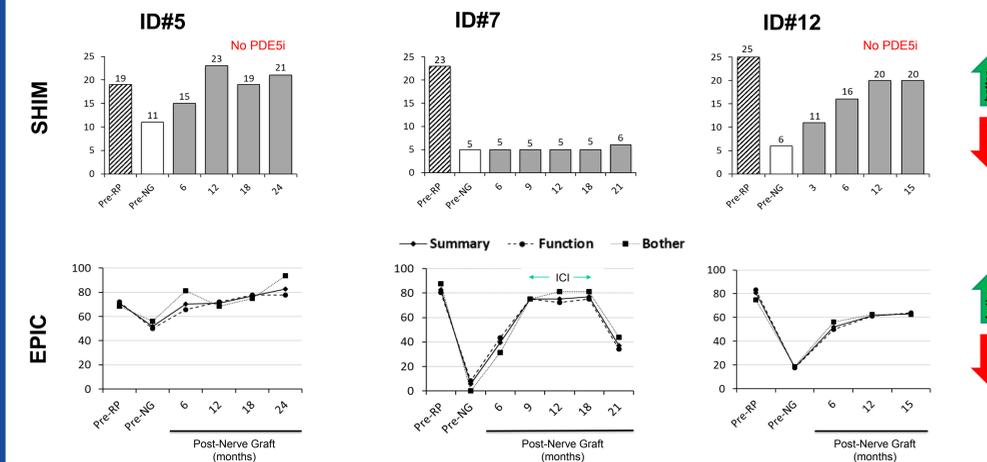
Patients who have undergone non-nerve sparing radical prostatectomy



Patients who have undergone bi-lateral nerve sparing radical prostatectomy



Patients who have undergone uni-lateral nerve sparing radical prostatectomy



Conclusions, patient outcomes following novel sural nerve grafting

- ✓ Innovative somatic to autonomic end-to-side sural nerve graft surgery successfully restored erectile function (IIEF-5 ≥ 17) sufficient for sexual intercourse in 11/17 (64.7%) men with permanent erectile dysfunction following radical prostatectomy
- ✓ Erectile function was restored in:
 - ✓ 6/8 (75%) men who had undergone **non-nerve** sparing RP
 - ✓ 3/6 (50%) men who had undergone **bi-lateral**-nerve sparing RP
 - ✓ 2/3 (66%) men who had undergone **uni-lateral**-nerve sparing RP
- ✓ 5/11 (45.5%) of patients have spontaneous erectile function restoration, without the need for PDE5is following novel nerve graft surgery
- ✓ Novel nerve graft surgery improves the sexual Quality of Life (QoL) of men
 - Largest improvements in the degree of symptoms (function of EPIC sexual domain) and reductions in the degree of problems experienced (bother of EPIC sexual domain) were observed in men with restored erectile function following novel nerve graft surgery.
- ✓ A larger study is currently underway to assess the impact of this novel nerve graft procedure in further Quality of Life domains (CESD, SEAR)
- ✓ Alternate treatment modalities (eg. penile prostheses) remain an option for patients where erectile function was not restored following novel nerve graft surgery.

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Study: Melbourne retrospective cohort review

- ❖ Novel sural nerve graft surgery was performed on 22 men with permanent erectile dysfunction:
 - >6 months after **non-nerve sparing** (NNS) radical prostatectomy
 - 10 patients (NNS)
 - >2 years after **nerve sparing** (NS) radical prostatectomy
 - 7 patients (Bilateral NS)
 - 5 patients (Unilateral NS)
- ❖ Patient-reported outcomes were assessed by retrospective cohort review of patient clinical data
- ❖ Changes in erectile function and sexual Quality of Life (QoL) were evaluated pre-radical prostatectomy, pre-sural nerve grafting and at 3-6 month intervals post-sural nerve grafting
- ❖ **Primary Outcome:** Erectile function was assessed using the 5-item version of the International Index of Erectile Function (IIEF-5)
- ❖ **Secondary Outcome:** Sexual Quality of Life (QoL) was assessed using the sexual domain of the Expanded Prostate Cancer Index Composite (EPIC) - summary, function and bother
- ❖ **Patient-reported outcomes were collected and evaluated independently of treating surgeons**
- ❖ Ethics approval for this retrospective cohort review was obtained at The Avenue Hospital, Melbourne, Australia (HREC No.227)

Patient inclusion criteria:

1. Be aged younger than 70 years
2. Have had satisfactory erectile function (IIEF ≥ 17) prior to radical prostatectomy surgery
3. Have PSA levels <0.1ng/ml in their most recent test following radical prostatectomy
4. Have moderate to severe erectile dysfunction (IIEF ≤ 11) prior to novel nerve graft surgery with or without oral and/or injectable therapies
5. Have had their radical prostatectomy within 5 years
6. Have no hormonal related conditions or diabetes
7. Have not had radiotherapy to treat prostate cancer (external beam and/or brachytherapy)
8. Have never taken androgen deprivation therapy

Successful restoration of erectile function criteria in study defined as:

- I. Restoration of spontaneous erectile function, or
- II. Restoration of erectile function with the use of PDE5i post-nerve graft surgery where these were ineffective pre-nerve graft surgery

Results

- 22 men with permanent erectile dysfunction underwent novel penile reinnervation **post**-radical prostatectomy
- Mean age was 62.5 ± 4.9 years (range 49.8 to 69.9 years) at the time of nerve graft surgery
- 3 patients were excluded:
 - One patient failed to adhere to penile rehabilitation regimes post-nerve grafting
 - One patient revealed severe erectile dysfunction prior to radical prostatectomy (IIEF = 6 on PDE5is)
 - One patient had comorbidity (insulin-dependent diabetes)
- Of the 19 remaining patients in study, 2 patients are at 6 months post-nerve grafting so these outcomes are not reported

Total number of patients included in study outcome analysis = 17 patients

- **11 out of 17 patients with permanent ED have restored erectile function sufficient to achieve & maintain full sexual penetration (IIEF-5 ≥ 17) following novel nerve graft surgery.**
 - 5 of the 11 patients with restored erectile function do not require any penile rehabilitation/PDE5i therapy to achieve an erection
 - 6 out of 8 patients (75%) who underwent **non-nerve** sparing radical prostatectomy have restored erectile function after novel nerve graft surgery
- **Improvements in sexual QoL outcomes (improved function and less bother in sexual domain of EPIC) were observed after novel nerve graft surgery**
 - greatest improvements in sexual QoL was observed in men with restored erectile function restoration (as assessed by IIEF-5)

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