



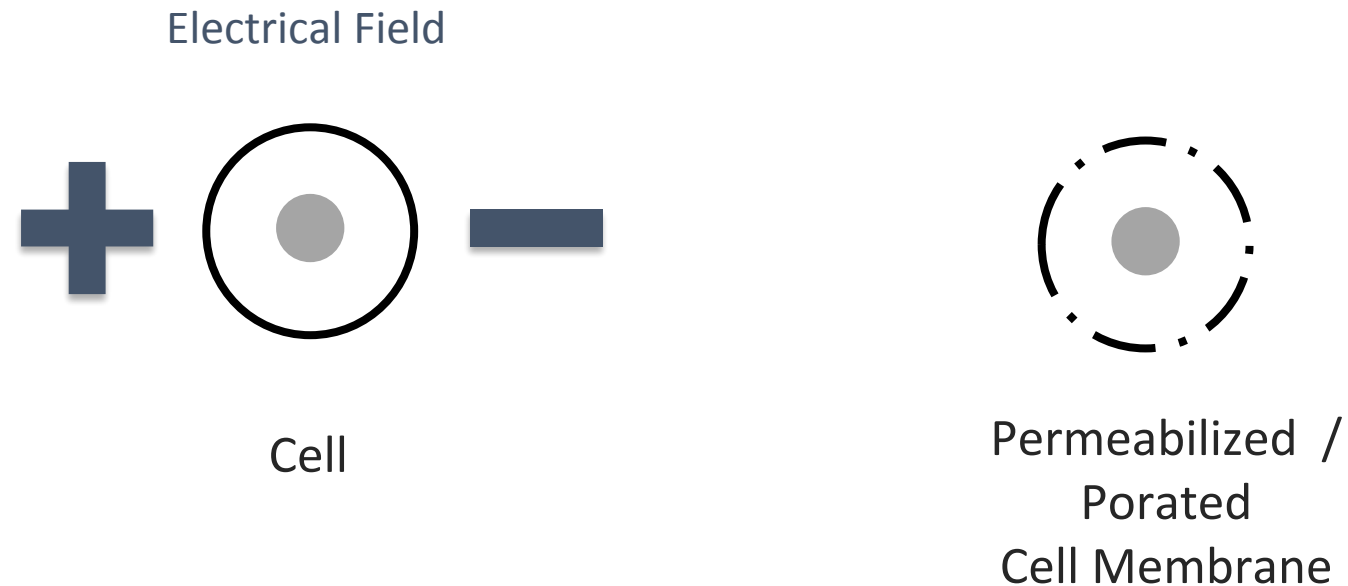
Nanoknife

Patient information

Electroporation

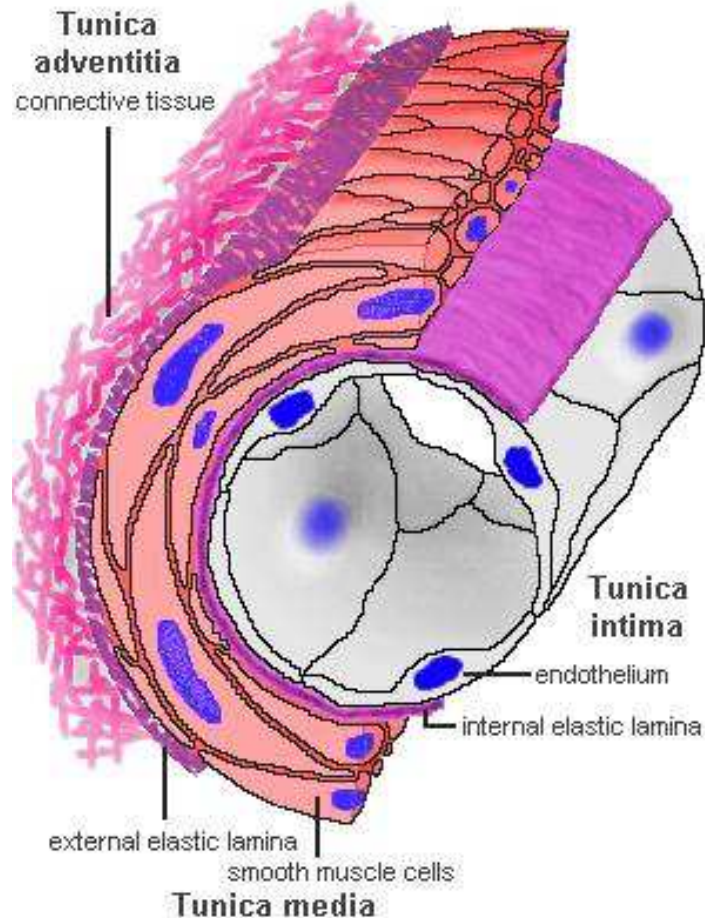
Electroporation:

The process of creating pores (holes) in the cell membrane using an electrical field



1. Li et al., PLoS ONE, 6(4): e18831, April 2011
2. Onik et al., Irreversible Electroporation: Implications for Prostate Ablation: Technology in Cancer Research and Treatment 6, 295-300 (2007).
3. Images adapted from: Bower et al., J. Surg. Oncol., 104(1): 22-28, July 2011

Cellular vs. Non-Cellular



All cells in ablation zone are affected by electrical field.

Fibrous and Collagen Structures are not affected.

- Intact adventitia & laminae visible at 2 days with no smooth muscle cells present.
- Endothelium largely repopulates at 2 days.
- Smooth muscle repopulated at 2 weeks.

IRE

- Reliable ablation
- Relatively quick day surgery procedure- 1 hour in total
- Repeatable
- Potential preservation of structures (rectum, urethra)
- Salvage Radical Prostatectomy still possible
- Prevent overtreatment for selected patients and offers safe and effective treatment with continuous active surveillance

NanoKnife® Prostate Procedure

The following are practices that have been utilized in the treatment of the prostate.

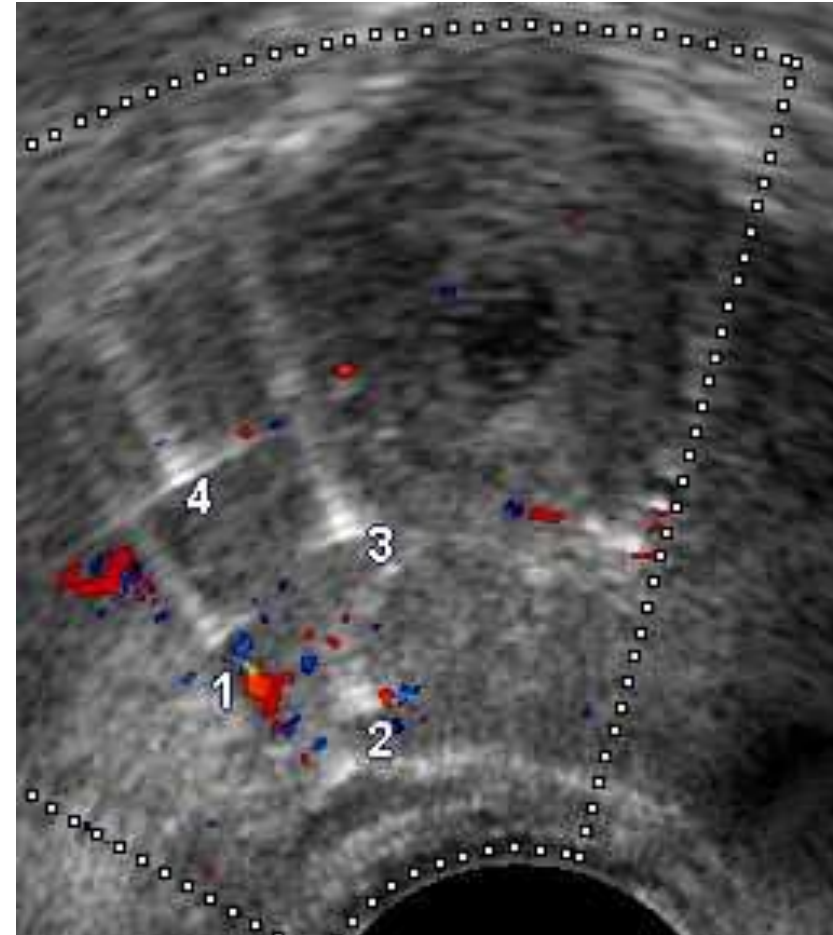
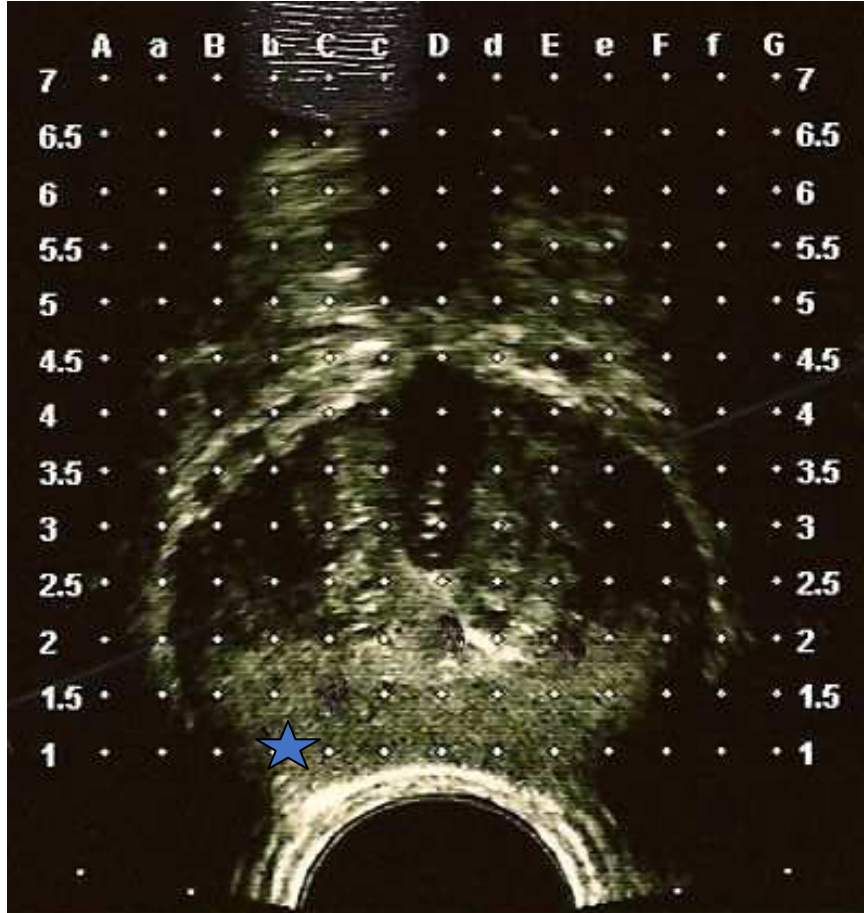
- Place a Foley catheter prior to placing the probes.
- Use the brachytherapy grid as electrode placement guide in conjunction with TRUS (Trans rectal ultrasound).
- Place the electrodes as close to the prostate capsule wall as possible if looking to achieve whole gland ablation.



First Focal Prostate Experience¹

Onik, et al

IRE Treatment



1. Onik et al., Series in Biomedical Engineering: Irreversible Electroporation, 235-247, 2010
Irreversible Electroporation: First Patient Experience Focal Therapy of Prostate Cancer

Australian experience: St Vincent's Clinic cohort

(6months to 5 years follow up)

- Primary Nanoknife treatment 190+ patients
- Salvage Nanoknife treatment 32+ patients
- Published data:

Focal irreversible electroporation as primary treatment for localized prostate cancer BJUI 2017 van den Bos et al.

Feasibility and safety of focal irreversible electroporation as salvage treatment for localized radio-recurrent prostate cancer BJUI 2017 van den Bos et al.

...

Focal irreversible electroporation as primary treatment for localized prostate cancer BJUI 2017 van den Bos et al.

A total of 63 patients

QoL questionnaire analysis demonstrated **no significant** change from baseline in physical, mental, bowel or urinary QoL domains but there was a mild decrease in the sexual QoL domain (median score 66 at baseline vs 54 at 6 months).

Compared with baseline, a decline of 70% in PSA level was seen at 6–12 months.

A narrow safety margin and system errors were identified as potential early risk factors for in-field oncological failure. In-field and whole-gland oncological control on follow-up biopsies was 84% and 76% this increased to 97% and 87% when patients treated with a narrow safety margin and system errors were excluded.

Feasibility and safety of focal irreversible electroporation as salvage treatment for localized radio-recurrent prostate cancer BJUI 2017 van den Bos et al.

A total of 18 patients

The median follow-up was 21 months.

No high-grade adverse events or recto-urethral fistulae occurred. No statistically significant declines were observed in QoL outcomes on the EPIC bowel domain, AUA symptom score, SF-12 physical or SF-12 mental component summary questionnaires.

At 6 months, patients who had undergone salvage therapy experienced a decline in EPIC sexual domain score (median of 38-24; $P = 0.028$) and urinary domain (median of 96--92; $P = 0.074$). Pad-free continence and erections sufficient for intercourse were preserved in 8/ 11 patients and 2/6 patients at 6 months, respectively.

The mpMRI was clear in 11/13 patients, with two single out-field lesions (true-positive and false-positive, respectively). The median PSA was 0.39 (0.04-- 0.43) tg/L.

Three and four patients experienced biochemical failure using the Phoenix and Stuttgart definitions of biochemical failure, respectively.

Eight out of 10 of the patients were clear of any PCa on follow-up biopsy, whereas two patients had significant PCa on follow-up biopsy.