

PP-39**Denonvillier's space expansion by hydrogel injection for thermal protection of rectal wall during prostate cryoablation to facilitate extensive freezing beyond the posterior prostatic surface: Cadaver study**

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Introduction & Objectives: During cryoablation of the prostate cancer the physical expansion of the Denonvillier's (DEN) space may safely improve oncologic outcomes with thermal protection of rectal wall. The objective of this study is to assess the feasibility of DEN space expansion by hydrogel injection in cadaver.

Methods: Using a fresh cadaver, 15 cc of hydrogel (DuraSeal®) was injected transperineally in the DEN space under transrectal ultrasound (TRUS) guidance. Three thermocouples were placed at 0mm, 5mm (in the center of hydrogel) and 10mm (on the rectal wall) distant from the posterior prostatic surface within the DEN (Figure 1). One cryoprobe was placed in the prostate 5 mm distance from the posterior prostatic surface. Two freezing-thawing cycles were employed to expand the iceball reaching the surface of the rectal wall as end-point. A phantom multiple-temperature mapping study of the hydrogel mass was also similarly performed.

Results:

Denonvillier's space expansion: Intraoperative TRUS visualized real-time the successful expansion (11 mm in thickness) of the DEN space (Figure). The gross anatomy revealed the hydrogel mass of 11 x 40 x 34 mm in volume, with no change in its shape over hours, no infiltration or invasion into the rectal wall or prostate, and no injury of any pelvic organs.

Temperature mapping: The lowest temperatures recorded on the posterior prostatic surface (0mm), in the center of the hydrogel (5mm), and on the rectal wall (10mm) were: -35 0C, -18 0C and zero 0C ($p < 0.001$), respectively. During the phantom study, the temperature mapping within the hydrogel mass proved that the lowest temperature at the point distant of 5 mm, 10 mm and 15 mm from a cryoprobe was -47 0C, -21 0C and -15 0C ($p < 0.001$), respectively.

Conclusions: Expansion of Denonvillier's space by the hydrogel injection is feasible under TRUS guidance to significantly distant the rectal wall from the posterior prostatic surface. The temperature mapping demonstrated potentially efficacy and safety. This new technique can facilitate cryoablation of the prostate cancer.

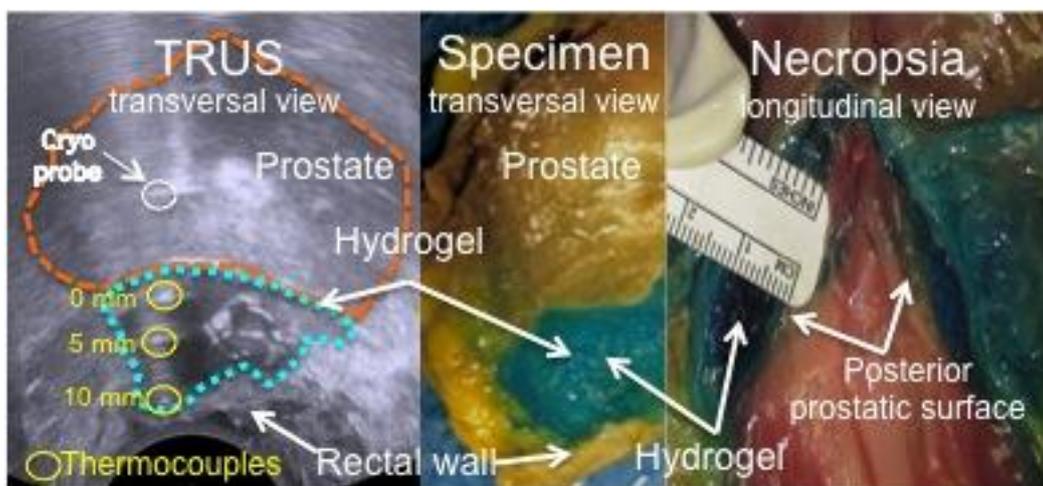


Figure 1