

Rectal Cooling Can Improve Early Continence

Preventing Incontinence Following **RARP and LRP** by Blunting the Inflammation Cascade

Behind cancer control the most feared outcome following robotic/laparoscopic radical prostatectomy (RP) is incontinence and recovery time. This lecture will carefully examine the definition of post-operative continence (i.e. no pads), how to predict time to postoperative continence, and a critical look at the impact of patient-related factors, technique, and hypothermia on time to and overall continence.

We recently published that patients prefer pad free continence¹; as demonstrated in Figure 1. It has also been well-established that predicting pre-operatively the time to continence is not practical. However, several reports now exist that reasonably predict time to continence postoperatively. We recently published work simplifying the findings of van Kampen and oth-

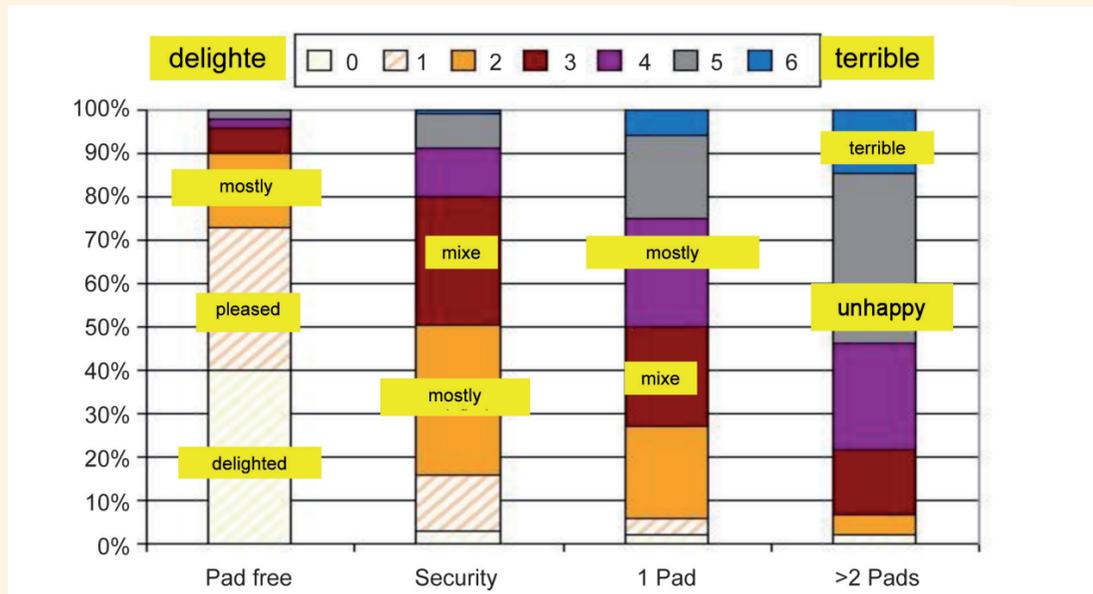


Fig. 1: Patients prefer pad-free continence.

With our cooling system the entire perineal region is easily cooled to temperatures of 5–10 degrees Celsius.

The balloon is placed immediately after the patient is anaesthetised and positioned and the cooling begins. So, before starting the surgical dissection, the entire perineal area is cooled. The concept of pre-emptive cooling



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reduces tissue temperatures and reduces cellular metabolism analogous to hibernation.

Hypothermia is a well-known knock-out anti-inflammatory with a well established history in cardiothoracic, neurological and transplant surgery. Urologists are well acquainted with the concept as a result of icing kidneys during open partial nephrectomy.

But what mechanism accounts for improved continence? It is well-described that in the inflammation cascade there is an apoptosis pathway. So although the amount of surgical trauma is equal regardless of age, older and less vital men do not tolerate the inflammation cascade – and hypothermia blunts the cascade.

Over the past 3 years, we now have no-pad continence outcomes in 300 patients. As Figure 4 suggests, if we can reduce inflammation-based trauma we should see significant improvement as men get older. This becomes evident starting at 50 years of age and is particularly evident at 70 years of age, as continence has improved from 73% to 92%. In addition to seeing the more objective finding of continence at 1 year, we have also observed a reduction in the median time to continence from approximately 60 days to 35 days.

Reference:
1. Liss MA. J Urol 2010;183:1464–1468.

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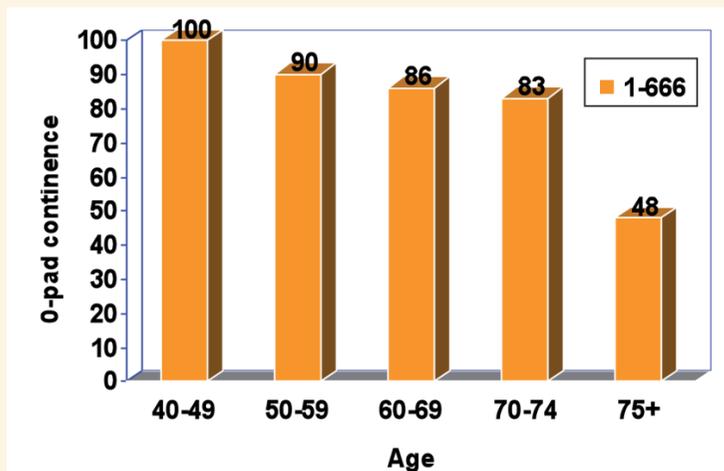


Fig. 2: Impact of age on 1 year no-pad continence.

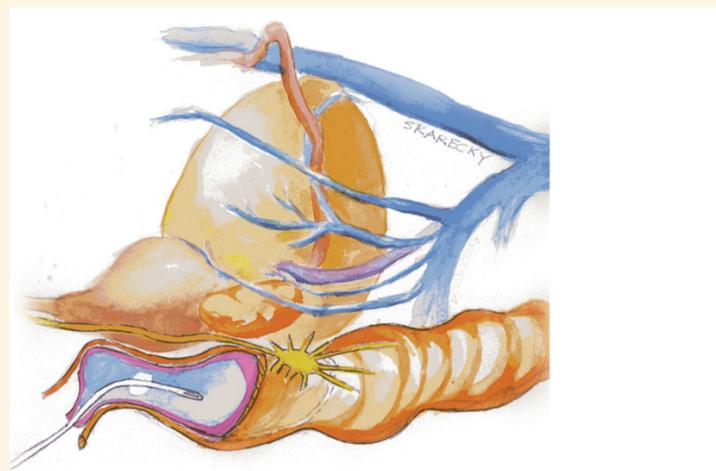


Fig. 3: Sketch of the concept of the endorectal cooling balloon that siphons heat away.

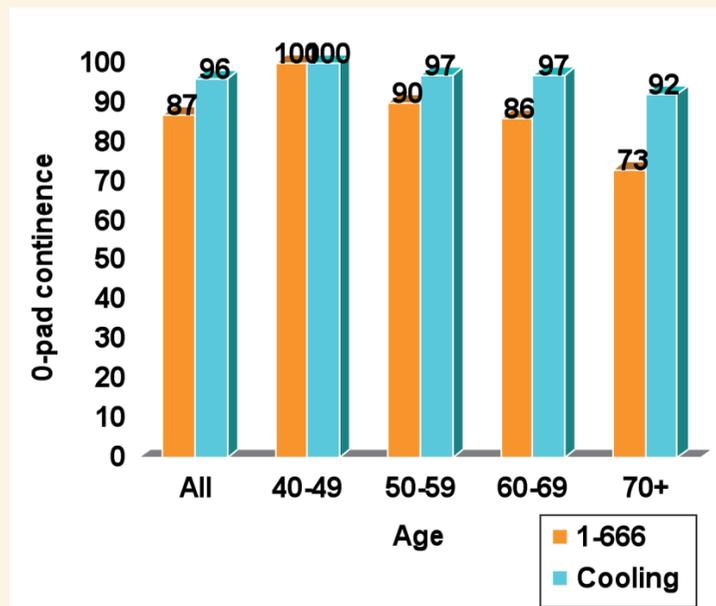


Fig. 4: Comparison of 1 year no-pad continence from controls (n=670) compared to hypothermia (n=300). p value for all <0.001.

ers (based on pad weights) that urinary leakage (based on pad usage) in the first week after catheter removal reasonably predicts time to continence.

We all know from experience that older men (especially men 70+ years) do not recover from surgery or recover

continence as well as men in their 40's or 50's. Nearly all studies carefully examining the role of preoperative characteristics have demonstrated the critical impact in multivariate analysis of age and IIEF-5 on pad-free continence at one year (Shikanov J.Urol 2010 and Pick BJU 2011). These two studies in particular demonstrated exactly the same relative risk (RR) of 0.97 of incontinence with each year of advancing age. Figure 2 depicts in graphic fashion just what impact age has on 1-year continence. As mentioned, other factors such as patient vitality which is reflected by IIEF-5 or Charlson and BMI also logically impact recovery of continence.

Worse recovery in older men

Any discussion of continence must include technique and the potential impact of surgeon experience. It is my opinion that when all is said and done technique and experience play a minor role as compared to the impact of patient related factors described above. For example, two of the most obvious technical advancements advocated in robotic or laparoscopic RP, the van Velthoven and Rocco sutures, have not shown unequivocal results with improving continence. That is, most open surgical series show 1-year continence rates within a few percent points of robotic or lap series. And irrespective of open versus

robotic/lap or use (or not) of anterior or posterior reconstruction all series demonstrate the same dramatic drop in continence of 30–40% in younger versus older men.

So what accounts for this? The amount of surgical trauma is not age related, so logic suggests that older men do not recover from the same inflammatory insult as well as younger men.

So we posed the question: Can we reduce the inflammation-based trauma?

Initial attempts to cool the pelvis intra-corporally failed and the idea of a rectal cooling balloon was suggested by Ralph Clayman. So beginning of February 2008, we initiated a trial using an endorectal cooling balloon (fig. 3).

From a thermodynamic point of view, the urogenital diaphragm including the external sphincter muscles are very amenable to hypothermia primarily due to the fact that the muscle has very little blood supply.



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