

Pudendal nerve block in HDR-brachytherapy patients: do we really need general or regional anesthesia?

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Abstract

Purpose In male patients, the pudendal block was applied only in rare cases as a therapy of neuralgia of the pudendal nerve. We compared pudendal nerve block (NPB) and combined spinal-epidural anesthesia (CSE) in order to perform a pain-free high-dose-rate (HDR) brachytherapy in a former pilot study in 2010. Regarding this background, in the present study, we only performed the bilateral perineal infiltration of the pudendal nerve.

Methods In 25 patients (71.8 ± 4.18 years) suffering from a high-risk prostate carcinoma, we performed the HDR-brachytherapy with the NPB. The perioperative compatibility, the subjective feeling (German school marks principle 1–6), subjective pain (VAS 1–10) and the early postoperative course (mobility, complications) were examined.

Results All patients preferred the NPB. There was no change of anesthesia form necessary. The expense time of NPB was 10.68 ± 2.34 min. The hollow needles (mean 24, range 13–27) for the HDR-brachytherapy remained on average 79.92 ± 12.41 min. During and postoperative, pain feeling was between 1.4 ± 1.08 and 1.08 ± 1.00 . A

transurethral 22 French Foley catheter was left in place for 6 h. All patients felt the bladder catheter as annoying, but they considered postoperative mobility as more important as complete lack of pain. The subjective feeling was described as 2.28 ± 0.74 . Any side effects or complications did not appear.

Conclusions Bilateral NPB is a safe and effective analgesic option in HDR-brachytherapy and can replace CSE. It offers the advantage of almost no impaired mobility of the patient and can be performed by the urologist himself. Using transrectal ultrasound guidance, the method can be learned quickly.

Keywords Pudendal nerve block · Epidural anesthesia · Infiltration · Transrectal ultrasound · HDR-brachytherapy

Introduction

In order to guarantee pain-free application of multiple hollow needles in a high-dose-rate (HDR) brachytherapy session in prostate cancer patients, general, regional or local anesthesia can be used [1]. During this procedure, which lasts about 80 min, the patient has to remain motionless in lithotomy position. Sudden movements could change position of the hollow needles and lead to dislocation. In 2010, we presented for the first time a comparison between a combined spinal-epidural anesthesia (CSE) and bilateral pudendal nerve block only (NPB) [2]. These data showed equivalent efficacy referring to pain reduction, but NPB patients favored quick mobility. Additionally, median time for CSE preparation was 30 min, whereas NPB took only 10 min to be applied. In order to collect more data about the use of this encouraging analgesic method in urologist's hands in HDR-brachytherapy, we

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evaluated an additional series of 25 patients, treated with HDR-brachytherapy and NPB only.

Patients and methods

In 25 patients, diagnosed with high-risk prostate cancer (PSA—value ≥ 20 ng/ml or Gleason Score ≥ 7 or cT3), HDR-brachytherapy was performed. Mean age was 71.8 years (64–79 years). A mean of 24 (13–27) hollow needles have been used in each patient (Varian medical systems[®], length 200 mm, diameter 1.65 mm). The perineal hollow needles were left in place for a mean time of 80 (60–100) min.

Mean prostate volume was 39 (14–68) ml. Radiation was applied to the prostate with intraprostatic hollow needles on day 1 and 8 with 9 Gray on each day. Starting with day 16, percutaneous radiation therapy was applied with dosages up to 50.4 Gray. All patients have been treated with NPB only. Following the classification of the American Society of Anesthesiologists (ASA), 6 (24 %) patients were classified in ASA 1, 13 (52 %) in ASA 2 and 6 (24 %) in ASA 3. Anticoagulants have been stopped before in 13 patients and replaced by low molecular heparin. The night before HDR-brachytherapy, patients received rectal enema and oral ciprofloxacin 500 mg therapy twice daily was started the day before and continued for 3 days. Flexible cystoscopy was performed intraoperatively in all patients and a transurethral 22 French, three-way irrigating catheter was left in place for 6 h. Evaluations of peri- and postoperative pain level, subjective well-being and mobility have been evaluated up to 6 h following the procedure. In order to measure pain, a visual analog scale has been used (VAS, 0 = no pain, 10 = maximum pain). Mobility was measured by 0 = no mobility, + acceptable mobility, ++ good mobility, +++ excellent mobility. Subjective well-being was measured using school grades: 1 = very good, 2 = good, 3 = satisfactory, 4 = sufficient, 5 = not sufficient and 6 = deficient (Table 1).

All data are presented as means (\pm SD), using WIN-Stat Excel[®] (R. Fitch Software) for calculation.

High-dose-rate brachytherapy and NPB are performed with the patient in lithotomy position. Cushioning of the lower legs is strongly recommended to avoid pressure lesions of the peroneal nerve. In order to provide a safe and effective NPB, the exact anatomical position of the pudendal nerve has to be taken into account. The pudendal nerve arises from three sacral roots (S-2 to S-4) and leaves the pelvis through the greater sciatic foramen to reach the deep gluteal region and to bend around the sacrospinous ligament. It divides into the perineal nerve and the inferior

rectal nerve. The NPB is applied at the level of the ischial spine (Fig. 1).

The patient is in the lithotomy position, and the ischial spine is identified by digital rectal palpation. One milliliter local anesthetics is injected intracutaneously 2–3 cm posteromedially of the ischiadic tuber. A needle (12–15 cm, 20-G, 0.9 mm) is used to perforate the sacrospinous ligament, using the index finger for exact positioning of the needle at the ischiadic tuber. Following aspiration, 5 ml local anesthetics (Prilocaine 1 %) are injected laterally and under the ischiadic tuber to block the inferior pudendal nerve. Another 5 ml local anesthetics have to be injected medially of the ischiadic tuber, and then the needle is moved forward another 2–3 cm in the ischio-rectal fossa, and another 5 ml are injected. After placing the needle dorsolaterally to the ischiadic spine, the sacrospinous ligament is perforated and another 5 ml are injected. The procedure has to be performed on both sides (Fig. 2). Transrectal ultrasound guidance of the needle with identification of the pudendal artery optimizes exact application of the local anesthetics (Figs. 3, 4). Checking the sensible areas of the nerves at the perineal skin and genitals can identify sufficient action of the NPB.

Results

Pudendal nerve block was performed in all 25 patients by the same urologist. Mean preparation and application time for bilateral NPB were 10.7 min (8–16 min, SD 2.3 min).

Subjective perioperative pain sensation (until the last hollow needle is in place) was evaluated using a visual analog scale and a numeric rating scale (0–10). Mean number was 1.4 (SD \pm 1.08) points in bilateral NPB. Another rating was performed 6 h later and showed a mean number of 1.08 (SD \pm 1.00) points.

No patient reported any severe impact of the NPB–HDR-brachytherapy on mobility 4–6 h after the intervention; 44 % ($n = 11$) reported excellent, 40 % ($n = 10$) good and 16 % ($n = 4$) acceptable mobility. No patient was dissatisfied.

Subjective well-being was measured using school grades (1 = very good to 6 = deficient) and showed in the mean 2.3 points (SD \pm 0.7).

Discussion

Pudendal nerve block was used in former times as an analgesic option in obstetrics, but has been replaced almost completely by epidural anesthesia [3–5]. Also in Urology, NPB almost vanished, but is still reported in some indications [6–8]. In 1991, Birch et al. [9, 10] reported a series

Table 1 Summary of the most important parameters in own data

	NPB (<i>n</i> = 25) means	Range	SD	CSE (<i>n</i> = 15) SD	NPB (<i>n</i> = 15) SD
Application time (min)	10.6	8–16	2.34	30.46	5.52
Needles left in place (min)	79.92	60–100	12.41	80.60	10.59
VAS (0–10)	1.40	0–4	1.08	1.2	1.01
peri-OP					
VAS (0–10)	1.08	0–4	1.00	0.86	0.83
6 h post-OP					
Subjective well-being (school grades 1–6)	2.28	1–4	0.74	2.73	0.79
Mobility	0 no mobility	0 (0 %)		6 (40 %)	0 (0 %)
4–6 h post-OP	+ Satisfactory	4 (16 %)		8 (53 %)	1 (7 %)
	++ Good	10 (40 %)		1 (7 %)	6 (40 %)
	+++ Excellent	11 (44 %)		0 (0 %)	8 (53 %)

A comparison of NPB and combined spinal-epidural anesthesia (CSE) from 2010

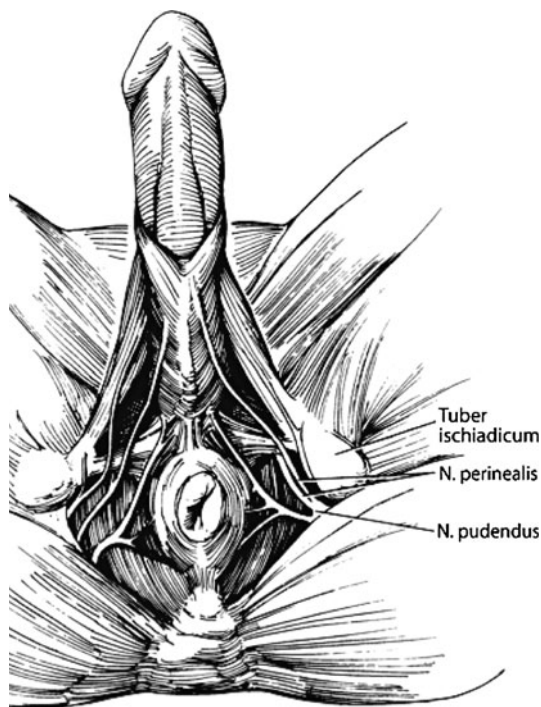


Fig. 1 Position of the pudendal nerve. Adapted from Hinman, German Translation (Rübben, Schenck), Atlas urologischer Operationen im Kindes- und Erwachsenenalter, Springer Verlag 2007

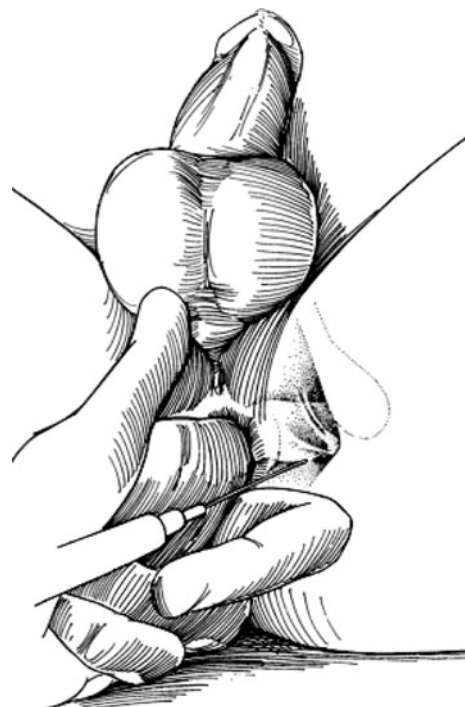


Fig. 2 Technique of pudendal nerve block. Adapted from Hinman, German Translation (Rübben, Schenck), Atlas urologischer Operationen im Kindes- und Erwachsenenalter, Springer Verlag 2007

of TURP in 100 patients with a combination of local anesthetics and midazolam. Patients received a mixture of 20 g lidocaine gel 2 % in the urethra. Additionally, a 1 % lidocaine/adrenaline (1:200000) mixture was injected in the prostate and bladder neck. On top, 3–10 mg midazolam intravenously were added. Using this analgesic regime, up to 40 g prostate tissue could be resected. Pain evaluation was performed using a VAS from 0 to 100. Mean pain levels were 10. Other authors also support this regime, but bilateral NPB was not used in one of the series [11–13].

Some data exist in chronic pelvic pain patients that recurrent NPB or even surgical decompression of the nerves may lead to improvement of the symptoms [14, 15]. Nevertheless, only some authors report their results of the ultrasound-guided, percutaneous, dorsal NPB [16–18]. Thoumas et al. [19] report in 1999 a CT-guided technique of the NPB in patients with chronic pelvic pain. The injection is applied from behind with the patient in prone position. Due to the need of a lithotomy position, this technique is not suitable for HDR-brachytherapy and would be too time consuming.



Fig. 3 The pudendal nerve (P) and the ischiadic tuber (X) are marked at the skin (pictures by Schenck). A needle (12 cm, 20-G, 0.9 mm) is used to inject 1 ml local anesthetics (Prilocaine 1 %) intracutaneously. Step-by-step the needle is pushed forward. Following aspiration, 5 ml local anesthetics are injected laterally and under the ischiadic tuber to block the inferior pudendal nerve. Another 5 ml local anesthetics have to be injected medially to the ischiadic tuber, and then the needle is moved forward another 2 cm in the ischioanal fossa, and another 5 ml are injected. The procedure has to be performed on both sides

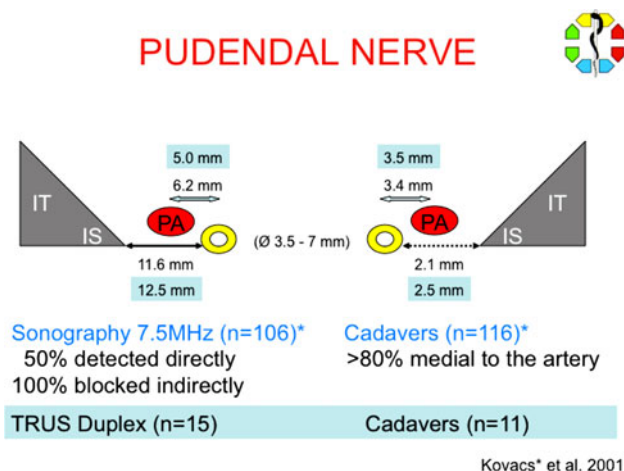


Fig. 4 This schematic diagram shows the position of the internal pudendal artery and the pudendal nerve. IT = ischiadic tuber, IS = ischial spine. *Marked asterisk* data from Kovacs et al. [21]. *Blue marked* data are own. Checking of position of the pudendal nerve (PN) to the internal pudendal artery (PA) at the ischial spine (IS) of cadavers gluteal region compared to transrectal ultrasound investigations in urological volunteers (TRUS Duplex)

Gruber and Kovacs described for the first time the ultrasound-guided technique of NPB [20, 21]. The pudendal artery and the pudendal nerve are identified from transgluteal, using a 7.5 MHz color Doppler sonography system. The exact course of the pudendal nerve has been described in cadaver experiments first.

Due to this preliminary work of Gruber and Kovacs, we started identification of the single anatomical structures for

NPB in urological volunteers, although we used a transrectal ultrasound system with duplex function (Siemens, G50) [20, 21]. Additionally, we also did 6 cadaver experiments in order to measure the distance between the pudendal artery and the pudendal nerve and the distance to the tip of the ischial spine. Results from cadaver experiments as well as ultrasound measurements in urological volunteers showed comparable results.

Our study group has published first results of NPB in comparison with CSE in HDR-brachytherapy patients in 2010 [2]. Our technique has to be performed in lithotomy position, which offers a big advantage for HDR-brachytherapy, because no change in position is necessary. On the other hand, NPB takes about 10 min, which is much quicker than CSE. Nevertheless, in case of insufficient pain management, CSE offers the advantage to reinject and to optimize pain management during or after therapy, which is not possible in NPB. In our first series, none of the 15 patients needed a reinjection peri- or postoperatively and the epidural catheter was removed immediately after treatment.

Urinary retention is no problem in CSE or NPB, because all patients receive an irrigating catheter for 4–6 h postoperatively in order to treat macrohaematuria, which occurs almost in all patients due to the invasive nature of the 24 hollow needles. Continuous irrigation with warm saline solution for this period minimizes the risk of blood clotting or vesical tamponade [1, 22].

These first data showed equivalent efficacy referring to pain reduction (VAS), but NPB patients favored quick mobility, especially missing control over the lower extremities in CSE, which could remain up to 6 h after HDR-brachytherapy was perceived as negative. Mobility was measured by 0 = no mobility, + acceptable mobility, ++ good mobility, +++ excellent. Subjective well-being was measured using school grades (1 = very good to 6 = deficient), and mostly due to the disadvantage of impaired mobility, CSE patients evaluated their well-being with 3 and NPB patients with 2 [2].

Conclusions

Bilateral NPB is a safe and effective analgesic option in HDR-brachytherapy and can replace CSE. It offers the advantage of almost no impaired mobility of the patient and can be performed by the urologist himself. Using transrectal ultrasound guidance, the method can be learned quickly. Additional indications can be chronic pelvic pain syndrome or neuralgia of the pudendal nerve.

Conflict of interest None of the authors has direct or indirect financial incentive associated with publishing the article.

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