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Local Anesthesia for the Prostate Gland

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1. Introduction

The number of prostate biopsies for detection of prostate cancer has been increasing. Local anesthesia prior to biopsy is crucial to improving pain control throughout the procedure. There are many different methods of administering local anesthesia of the prostate and debate still remains regarding the best site for injection, as well as the ideal type and dosage of anesthetic to use for maximum pain relief. Below we outline the history behind local anesthesia of the prostate, the different methods used to administer it and the pros and cons of these approaches.

Prostate cancer is the most common cancer among men in the United States. In 2010 it was estimated that 217, 730 men in the United States were diagnosed with prostate cancer.[1] Although serum prostate specific antigen (PSA) testing and digital rectal exams (DRE) help identify men at risk for prostate cancer the gold standard for diagnosis is currently biopsy of the prostate. With recent trends towards PSA screening there has been an increase in the number of men being diagnosed with prostate cancer and the number of men undergoing biopsy of the prostate. It has been estimated that as many as 800,000 biopsies of the prostate are performed in the United States each year making it one of the most common office procedures for urologists.[2]

Since the majority of prostate cancer foci are not visible on ultrasonography, Hodge et al. proposed systematic sextant random biopsy in order to improve cancer detection rate in 1989.[3] Over the years, the development of prostate biopsy has moved from the original 6 core sextant biopsy to more extended protocols, which allow more extensive sampling of the gland. Most contemporary biopsy protocols today attain 12-16 cores with some protocols advocating for 20 plus cores.[4] Furthermore, the development of active surveillance protocols have required men to undergo serial biopsies as frequently as every 6-12 months to detect tumor progression, making prostate biopsy a frequent procedure for men on such surveillance protocols.

Although biopsy of the prostate has been considered a fairly well tolerated procedure, recent studies have suggested that as many as 90% of patients found the procedure painful.[5] A recent study by Irani et al. reported that 6% of patients felt the procedure should be done under general anesthesia and 19% of patients would refuse the procedure without any analgesia.[6] Furthermore, another study found that 16% of biopsies could not be completed

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due to pain when anesthesia was not used compared to only 2% of procedures that could not be completed when anesthesia was provided. As a result, the American Urological Association, the European Urological Association and the National Comprehensive Cancer Network currently call for the use of analgesia for pain relief during biopsy of the prostate. Despite this, a recent survey suggested that one third of urologists do not provide any anesthesia during the procedure.[7]

Although there is no consensus on the form or technique used for analgesia, most urologists administer local anesthetic to the prostate prior to biopsy. The most common forms of local anesthesia to the prostate currently include peri-prostatic nerve block, intra-rectal local anesthesia and intra-prostatic injection of local anesthetic. In this review we will discuss the development of local anesthesia of the prostate and the various techniques used to administer it.

2. Anatomy of the prostate

The average prostate weighs 20-25 grams in size in young men and is located just beneath the bladder. It is fixed to the pubic bone anteriorly by the puboprostatic ligaments, cradled laterally by the levators and is directly related to the overlying endopelvic fascia. The prostate is composed of 70% glandular and 30% fibromuscular stroma and can be divided into 4 main zones. The transitional zone, which makes up 5-10% of the gland, surrounds the urethra and is responsible for prostate enlargement problems. It accounts for approximately 20% of prostate cancers. The central zone accounts for 25% of the gland, surrounds the ejaculatory ducts, and is responsible for approximately 1-5% of cancers. The anterior fibromuscular zone does not contain any glandular components but rather muscle and connective tissue. Finally the peripheral zone makes up 70% of the gland, covering the posterolateral aspect of the prostate, and accounts for the majority of prostate cancers.[8]

2.1 Vascular and lymphatic supply

The main arterial blood supply to the prostate is through the prostatic artery, which is a branch of the inferior vesical artery. It divides into a urethral artery and a capsular artery. The urethral artery enters the prostatovesical junction posterolaterally and supplies the transition zone, prostatic urethra and the periurethral glands. The capsular artery runs posterolateral to the prostate with the cavernous nerves in the neurovascular bundle. It pierces the gland at right angles and sends several small branches to the anterior capsule. Venous drainage of the prostate is abundant through the periprostatic plexus. Lymphatic drainage of the prostate is primarily to the obturator and internal iliac lymph nodes.[8]

2.2 Innervation of the prostate

The prostate is thought to have both sympathetic and parasympathetic innervation. Sympathetic fibers come from the grey matter of the last 3 thoracic and first 2 lumbar segments of the spinal cord. They traverse the paravertebral sympathetic chain and reach the pelvic plexus via the superior hypogastric plexus.[9] The parasympathetic fibers originate from the intermediolateral cell column of the second, third and fourth sacral spinal nerves. They arise as pelvic splanchnic nerves that join the hypogastric nerve and branches from the sacral sympathetic ganglia to form the pelvic plexus.[9]

The pelvic plexus sits lateral to the rectum and is perforated by several vessels going to and from various pelvic organs. Its midpoint is at the tips of the seminal vesicles.[10] The caudal portion of the pelvic plexus gives rise to the innervation of the prostate and the cavernous nerves.[11] These nerves pass the tips of the seminal vesicles then lie in the lateral endopelvic fascia near its junction with denonvilliers fascia.[12] They join the capsular artery of the prostate and travel along the posterolateral border of the prostate on the surface of the rectum and make up the neurovascular bundle.[13]

With respect to the sensory innervation of the prostate, neuronal cell bodies that give rise to sensory afferent fibers are not well known. Studies in cats have suggested that over 90% of primary afferent neurons are located in the sacral dorsal root ganglion. It is thought that 70% of these primary sensory afferents project axons to reach the prostate via the pelvic nerve, while 30% project axons via the pudendal nerve. The remaining 10% of primary afferent neurons are found in autonomic neurons in the sympathetic chain ganglia, inferior mesenteric ganglia, and ganglia in the pelvic plexus.[14]

3. Sources of pain

During transrectal ultrasound guided biopsy of the prostate, there are often two sources of pain described by the patient. The first is during insertion of the ultrasound probe into the rectum. This is due to mechanical stretching of the anal canal distal to the dentate line, which is full of sensory fibers.[15] The rectal mucosa above the dentate line has a relatively low sensitivity to pain and it is believed that the pain during biopsy is not closely related to needle penetration of the rectal wall. In contrast, the prostate capsule and parenchyma are very sensitive to pain and needle penetration of the capsule can cause pain via nerve stimulation of sensory receptors in the capsule and transmission of pain through the neurovascular bundle.[15]

A recent study randomized 150 men to no anesthesia, 10 ml of 2% lidocaine gel intra-rectally or a peri-prostatic injection of 5 ml of 1% lidocaine solution prior to ultrasound guided biopsy of the prostate.[16] They found that both groups who received anesthesia reported less pain then the group that did not receive anesthesia. The group that received intra-rectal lidocaine gel reported the least pain with ultrasound probe insertion, while the group that received peri-prostatic lidocaine injection reported the least pain with the actual biopsy. This study lends support to the two different sources of pain described during the biopsy procedure. Innovative techniques to anesthetize the prostate during the procedure tend to address both sources of pain to maximize analgesic affect and tolerability of the procedure.

4. History of prostate local anesthesia

4.1 First utilization

Transrectal ultrasound (TRUS) guided prostatic biopsy came of widespread clinical use in the mid-1980s.[17] Prostate local anesthesia was not common practice until 1996 when Nash et al first described the benefit of prostate nerve block during prostate biopsy.[18] Periprostatic block was achieved by single local injection, on each side of the prostate, into the region of the prostatic pedicle at the base of the prostate just lateral to the junction between the prostate and seminal vesicles. The posterolateral area of fat within the notch between the prostate and seminal vesicle is described as the 'Mount Everest sign' as it creates a

hyperechoic pyramid, which can allow for localization of anesthetic placement.[19] The technique was later modified by placing two further depot injections on each side of the prostate on the lateral aspect.[14] Subsequent studies have demonstrated successful periprostatic infiltration only at the apex at the 4 and 8 O' clock positions.[20,21]

4.2 Evolution of prostatic analgesia

After successful application of periprostatic nerve block, different forms of analgesia were investigated. In 2000, Issa et al first described application of intrarectal lidocaine gel during TRUS-guided prostate biopsy.[22] This form of local analgesic was found to be simple, safe and effective in providing satisfactory anesthesia during this procedure. Furthermore, this technique was found to be more convenient, better tolerated and less invasive compared to transrectal and transperineal prostate nerve blocks. Subsequent studies have supported the use of intrarectal anesthetic gel for purposes of prostate biopsy.[16,23] Several researches have successfully improved intrarectal lubricating analgesia by adding topical drugs or compounds. [24-27] Nifedipine blocks slow calcium channels and thus potentially allows for analgesia during probe insertion by way of anal-sphincter relaxation.[27] Topical glyceryl trinitrate (GTN) similarly causes smooth muscle relaxation with subsequent decreases in anal sphincter tone. GTN was found to be safe, easy to handle and effective in pain control during prostatic biopsy. [25,26] Dimethyl sulphoxide (DMSO) is known to facilitate movement of drugs across cell membranes. It has been shown to be effective for musculoskeletal pain when applied topically and has a potential to reduce rectal discomfort.[28] Recently, more attention has been given to using a combination of these approached to maximize anesthetic efficiency and pain relief. In 2001, pelvic plexus block during TRUS-guided prostate biopsy was first described. This approach failed to diminish biopsy-associated pain.[29] Alternatively, several studies did demonstrate success with pelvic plexus block under skilled guidance and doppler ultrasound.[30,31] Caudal block has also been utilized as an approach to anesthetize the prostate as it provides perianal analgesia and anal sphincter relaxation. However, mixed results have been published regarding its efficacy.[32,33]

5. Use of prostatic analgesia

5.1 Local

Periprostatic nerve block has become of widespread use and is the most common form of analgesia for prostatic biopsy.[28,34] One or 2 % lidocaine is typically used as it is effective, economical and safe. Lidocaine also has relatively long duration of action but it is unclear what the optimal dose, concentration and location is for maximum pain relief. The most common injection site is the angle between the prostate base and the seminal vesicles bilaterally.[28]

Lidocaine gel is most widely used lubricating agent during prostate biopsy.[28] This form of prostatic analgesia is considered to be safe, easy to handle and inexpensive. Studies have revealed that this type of anesthetic is effective in controlling pain associated with rectal probe insertion and manipulation.[28]

Caudal block and pudendal nerve block require the presence of an anesthetist as knowledge and individualization of the anatomy is required as well as need for patient monitoring after drug administration during hospitalization.[28]

5.2 Systemic

While early strategies for prostatic analgesia during TRUS-guided biopsy typically involved use of local agents, current investigations are evaluating safety and efficacy of combination and systemic therapies. A meta-analysis done by Maccagnano et al found that pain control seems to be superior with systemic analgesic such as tramadol or combination tramadol, especially with non-steroidal antiinflammatory agents.[28] Nitrous oxide, while not widely available in urology outpatient clinics has shown to be an attractive systemic alternative in several studies.[35-37] Sedoanalgesia with agents such as propofol, fentanyl or midazolam should be reserved for when extensive or repeat biopsies are needed.[17,28]

6. Application of prostate anesthesia

Use of local prostatic analgesia has successfully extended beyond TRUS-guided prostatic biopsy alone. Local prostatic analgesia has been proven to provide safe and effective pain relief during other minimally invasive procedures of the prostate, including various procedures used to treat symptomatic benign prostatic hypertrophy (BPH). Historically, these procedures are accomplished by way of general and/or regional systemic analgesia. There is now greater recognition of the potential to use local analgesia because of cost- effectiveness and relatively fewer contraindications to local rather than systemic or regional anesthesia.

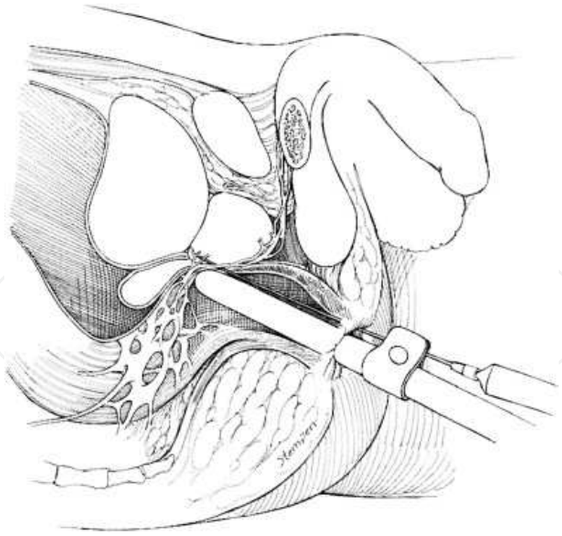
Periprostatic nerve block has been shown to be effective during transurethral resection of the prostate (TURP).[38,39] Kedia[40] described a local analgesic protocol that was safe, economical, and an effective way to perform interstitial laser coagulation for treating BPH. Other minimally invasive treatments for BPH have been preformed successfully under local anesthesia with good results including transperineal microwave ablation of the prostate, radiofrequency-induced thermotherapy of the prostate, transurethral ethanol ablation of the prostate, photoselective prostate vaporization and transurethral needle ablation of the prostate.[41-45]

Furthermore, studies have shown that periprostatic nerve block can successfully be applied to procedures such as internal urethrotomy, transurethral incision of prostate and bladder biopsies or fulguration while providing excellent pain relief. Periprostatic nerve block has also been used effectively for other urologic procedures such as the placement of intraprostatic fiducial markers prior to external beam radiotherapy.[46 47] Local anesthesia of the prostate has also been used for brachytherapy and cyroablation of the prostate with a high degree of patient satisfaction and cost-effectiveness.[48,49]

7. Technique

7.1 Peri-prostatic nerve block

The first description of peri-prostatic injection was by Nash et al. who described bilateral injections between the base of the prostate and the seminal vesicles (Figure 1).[18] The original study reported a decrease in pain on the side that was injected with local anesthetic compared to the side that was not. This was modified by Soloway and Obek, who proposed two additional injections on each side, with one at the midgland and one at the apex of the prostate.[14] Peri-prostatic nerve block works by anesthetic blockage of capsular sensory fibers, resulting in less pain, anxiety and more relaxation of the pelvic muscles, making the procedure more tolerable.



J Urol. Feb 1996;155(2):607-609 with permission

Fig. 1. Ultrasound probe in situ and spinal needle placement within neurovascular bundle at base of prostate just lateral to junction between prostate and seminal vesicle (Reproduced from *Transrectal ultrasound guided prostatic nerve blockade eases systematic needle biopsy of the prostate* by Nash et al.)

Since its first description by Nash et al, multiple studies have tested the efficacy of peri-prostatic nerve block. A recent study randomized 90 patients to no anesthesia, peri-prostatic injection with saline and peri-prostatic injection with 1% lidocaine 5 minutes before biopsy and used a visual analog scale to assess pain.[50] They reported a significant reduction in pain for those men who received peri-prostatic injection of anesthetic. This study has been supported by many meta-analysis, which have showed a benefit in pain reduction during biopsy with peri-prostatic injection of local anesthetic compared to placebo or no anesthesia.[51-53] A recent meta-analysis involving 20 studies and 1685 patients found a significant reduction in pain (weighted mean difference of -2.09, 95% CI -2.44 to -1.75, $p<0.0001$ on a 10 point scale) when comparing peri-prostatic nerve block to no anesthesia or placebo.[53] These authors found similar benefits for peri-prostatic nerve block over no anesthesia or placebo regardless of the site injected.

Studies have also compared the efficacy of peri-prostatic nerve block to intra-rectal anesthetic. Song et al conducted a placebo controlled randomized trial where men were given either 20 ml 2% lidocaine gel intra-rectally, a peri-prostatic injection of 5 ml of 2% lidocaine delivered near the junction of the seminal vesicle and base of the prostate, or a peri-prostatic injection of 5 ml of normal saline injected in a similar location prior to prostate biopsy.[54] They reported a benefit of peri-prostatic nerve block with lidocaine over placebo injection and intra-rectal lidocaine gel. They did not find a benefit for intra-rectal lidocaine gel over placebo injection. These results are supported by a meta-analysis of 6 studies with 872 patients comparing peri-prostatic nerve block to intra-rectal local anesthetic.[53] The authors reported a weighted mean difference of -1.53, 95% CI -2.67 to -0.39 ($p=0.008$), on a 10 point scale in favor of peri-prostatic nerve block over intra-rectal local anesthetic.

Currently there is much variation reported on the ideal location for injection to provide maximum pain relief throughout the biopsy procedure. The initial description by Nash et al

suggested bilateral injections between the base of the prostate and seminal vesicles.[18] Since then many studies have advocated for more apical injections.[55,56] The neurovascular bundles run postero-lateral to the prostate gland between the capsule and Denovilllier's fascia and pierce the capsule at the base and apically at the 4 and 8 o'clock location. It has been suggested that injection at these locations will numb the whole gland.[20] A recent study randomized 60 men to bilateral basal injections and 57 men to a single apical injection and found a significant benefit for men who received a single apical injection (p=0.01).[55] The other benefit for a single apical injection was less anesthetic required. This was supported by a study involving 386 men, who were randomized to receive no anesthetic, 10 ml of 1% lidocaine at the apical region of the prostate, 5 ml of 1% lidocaine at the bases of the prostate bilaterally, and lastly 4 ml at the apex and 3 ml at the bases bilaterally of 1% lidocaine.[56] The authors found that 10 ml of apical local anesthetic had the most superior pain relief. However, other studies have not supported this finding. For instance, a study by Philip et al randomized143 men to either apical or basal injections and found no significant difference in pain relief between the two (p=0.36). Currently, the location of injection to induce maximal pain relief is still debatable.

Several studies have assessed the most appropriate dosage of local anesthetic for pain relief during the procedure. Ozden et al randomized 175 men to receive either 2.5 ml, 5 ml or 10 ml of 1% lidocaine and found that 10 ml of local anesthetic provided significantly better pain relief then lower doses.[57] The authors felt that 2.5 ml of local anesthetic was probably not very effective. It has also been suggested that the use of longer acting anesthetics, like bupivacaine, in combination with shorter acting agents can provide longer lasting analgesia and decrease post biopsy discomfort while acting as fast as shorter acting agents.[58] There is still much variation among urologists as to the dose, concentration and type of local anesthetic used.

7.2 Intra-rectal local anesthetic

Another method of providing pain relief during the procedure is to deliver 10-20 ml of intra-rectal gel containing local anesthetic before the procedure. This works to anesthetize the sensory fibers in the anal canal below the dentate line and serves mainly to decrease pain during insertion of the ultrasound probe. Intra-rectal application of lidocaine jelly prior to biopsy was first described by Issa et al, who demonstrated reduced discomfort and pain during the procedure.[22] This was supported by a study involving 80 men who were randomized to either no anesthesia or peri-anal or intra-rectal local anesthetic. The authors reported that peri-anal anesthesia may solely be sufficient to decrease the pain during prostate biopsy. A recent meta-analysis involving 5 studies and 466 patients found the intra-rectal local anesthetic provided better pain relief then no anesthetic or placebo, but the weighted mean difference between the groups did not reach statistical significance.[53] Other studies have suggested that intra-rectal local anesthetic alone is not sufficient for pain relief during the biopsy procedure.[59] Although it works well to reduce the pain associated with probe insertion it does not address the pain associated with injection of the prostate capsule.

7.3 Combination peri-prostatic block and intra-rectal local anesthetic

Contemporary protocols have suggested a combination of peri-prostatic nerve block and intra-rectal local anesthetic prior to biopsy of the prostate. This is thought to provide the most efficient relief of pain during the procedure by addressing the two sources of pain

individually (probe insertion and injection into prostate capsule). Obek et al found that the combination of peri-prostatic block and intra-rectal lidocaine worked better then peri-prostatic block alone in a randomized study of 300 men.[60] This is supported by a study involving 223 men showing that peri-prostatic nerve block in addition to intra-rectal local anesthetic provided superior pain relief compared to peri-prostatic nerve block and intra-rectal placebo.[61] Raber et al, noticed a similar benefit to combined peri-prostatic nerve block and intra-rectal local anesthetic over peri-prostatic nerve block alone especially with respect to pain during insertion of the ultrasound report.[62] This lends support to local anesthesia protocols that address both sources of pain during the biopsy procedure. Giannarini et al. reported a randomized study of combination perianal anesthetic cream and periprostatic nerve block. Interestingly in this study, the group with perianal-intrarectal anesthetic cream application had reduced pain score associated with periprostatic block and prostate biopsy. These results suggest that a large dose of lidocaine-prilocaine (5g) intrarectal application 30 minutes prior to the procedure itself can achieve certain anesthetic effect on not only the procto canal but also the prostate gland.[63]

7.4 Intra-prostatic injection of local anesthetic

The first use of intra-prostatic injection was described by Mutaguchi et al. who observed a significant benefit in 71 patients who received intra-prostatic injection from 2002-2003 compared to 99 patients who received traditional peri-prostatic injection from 2001-2002.[64] Intra-prostatic injection provides local anesthetic to sensory fibers within the parenchyma of the prostate, which have a high sensitivity to pain. Secondly, peri-prostatic nerve block does not anesthetize the anterior part of the gland, while intra-prostatic injection does. A randomized, double-blind, 3-arm parallel group study compared 243 men randomized to intra-prostatic injection of local anesthetic, peri-prostatic block to the apical region of the prostate, and peri-prostatic block to the base of the prostate.[65] The authors found that intra-prostatic injection provided superior pain relief compared to basal blockade and similar pain relief to apical blockade.

Other studies have suggested that a combination of intra-prostatic injection and peri-prostatic injection of local anesthetic provides superior pain relief then either alone.[66-68] For example, Binggian et al. randomized 300 men to peri-prostatic and intra-prostatic local anesthetic versus peri-prostatic local anesthetic and intra-prostatic saline.[66] They reported significantly less pain in the group that received combined peri-prostatic and intra-prostatic local anesthetic. Cam et al. found a similar benefit with combined intra-prostatic and peri-prostatic blockade over peri-prostatic blockade alone with no increase in morbidity.[67] Finally, a recent study randomizing 152 patients to either intra-prostatic local anesthetic and peri-prostatic placebo injection, intra-prostatic placebo injection and peri-prostatic local anesthetic or intra-prostatic and peri-prostatic local anesthetic found a significant benefit in pain relief in men who received combined intra-prostatic and peri-prostatic local anesthetic to just peri-prostatic or intra-prostatic local anesthetic alone.[68]

Current Protocol for Local Anesthesia of the Prostate at University of California, San Franciso (UCSF)

Currently, at UCSF, we use a combination of intra-rectal local anesthetic, periprostatic nerve block and intra-prostatic injection of anesthetic to provide fast and efficient relief of pain throughout the procedure (see Figure 2). We use intra-rectal 20% Benzocaine cream applied

to the procto canal at the time of the digital rectal examination prior to the ultrasound procedure. Benzocaine is a fast acting mucosal anesthetic achieving effective pain relief in 30 seconds to help minimize pain during probe insertion. Currently, a 1% lidocaine 20 cc solution without sodium bicarbonate or epinephrine is used. About 4cc of the solution is injected in the periprostatic fat at the lateral aspect of prostate and seminal vesicle junction bilaterally (see Figure 3). The rest of the solution is directly injected into the prostate at three locations in each lobe by inserting 22G needle all the way to the anterior capsule at the base, mid gland and the apex, and as the needle is pulled back about 2 cc of anesthetics is slowly infiltrated in the prostate parenchyma at each location. By doing this, systemic circulation of anesthetics can be avoided, and anesthetize the entire gland including the anterior part.

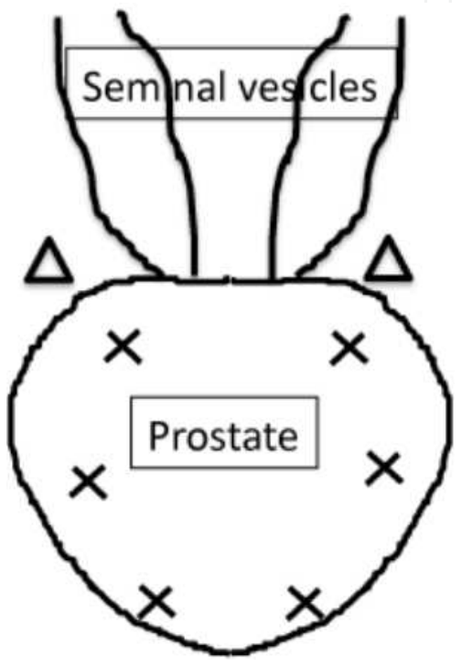


Fig. 2. Local prostatic anesthesia; X's represent intraprostatic injection sites, Triangles represent periprostatic injection sites

8. Complications

There has been comparatively little emphasis placed on evaluation of complications from local prostatic analgesia. Current studies suggest that most forms of local prostatic analgesia are generally safe and well tolerated.[69] The reported complication rate associated with periprostatic nerve block ranges from 2-4%.[17,20,69,70] No significant complication differences were found with intraprostatic analgesia injection[64,67,68] or topical agents.[22,63,71] Of note, reported morbidity is confounded by the fact that many of the complications (i.e. bleeding, infection) can result from the prostatic biopsy itself (i.e. without use of anesthetic).

8.1 Pain

A short-lived, mild "stinging" sensation during injection of the periprostatic nerve block has been reported in the current literature.[20] One study found that about a third of patients

undergoing TRUS-guided prostate biopsy experienced discomfort upon injection of analgesic.[69] There are no studies that have documented persistent pain from any form of prostatic analgesia

Fig. 3. Ecographic longitudinal image of prostate injection site demonstrating fat plane between prostate and seminal vesicle

8.2 Bleeding

While bleeding can be associated with TRUS-guided prostatic biopsy,[54,72] no reports of significant bleeding attributed to administration of prostatic analgesia have been reported. One study compared complication rates according to number of injections and found no increase in bleeding with greater number of injections.[57] Obek et al actually found a decrease in the incidence of bleeding in patients who received periprostatic nerve block which was explained by improved patient comfort resulting in less movement during the procedure.[70]

8.3 Infection

As the rectum is highly colonized by bacteria, it was questioned whether periprostatic analgesia was associated with high infection rate.[70] The current literature generally disproves this theory.[20,57,73] Conversely, Obek et al did find the incidence of bacteruria, high fever and hospitalization to be higher in the anesthesia group but none of these findings were statistically significant.[70]

8.4 Urinary symptoms

Transient urinary incontinence was reported in 1.5% of patients within first 10 minutes after injection of anesthetic.[69] It was further recommended that patients undergo pre-procedure micturition. Other reports found no change in post biopsy continence after perioprostatic local anesthesia.[74]

8.5 Systemic toxicity

Systemic toxicity results from accidental intravascular injection of anesthetic agent. Clinically, this can appear as dizziness, visual disturbance, tinnitus, metallic taste, lightheadedness, diaphoresis or respiratory distress. The reported incidence of anesthetic toxicity from periprostatic nerve block ranges from 2%-4%.[17,20,70] Vasovagal syncope was reported in as high as 1% of patients,[54] however, vasovagal responses without the application of anesthetic have been reported as well.[69] In addition to aspiration prior to injection, Seymour et al suggested the use of color doppler ultrasound to prevent accidental intravascular injection.[20]

8.6 Other considerations

Authors have expressed concern that minute amounts of air that can potentially be injected during periprostatic analgesia, creating significant image artifacts. Several studies disclaim this. Risk of image artifacts can further be reduced with careful bleeding of the syringe prior to injection and assurance that anesthetic agent is injected outside of the gland.[28] Studies have also reported no difference in intraoperative findings such as fibrosis or loss of planes between the rectum and prostate at radical prostatectomy after prostate biopsy with local anesthetic.[53]

9. Conclusion

With increasing trends towards PSA screening and more utilization of active surveillance protocols for low volume minimal risk disease the number of prostate biopsies being performed are increasing. Contemporary biopsy protocols are calling for more cores and extended sampling of the peripheral zone compared to the previous sextant description. Although once considered a fairly benign procedure, most patients find biopsy of the prostate to be painful and have expressed a desire to be given some anesthetic for pain relief. Most guidelines now consider anesthesia to be a standard of care when performing biopsy of the prostate as it provides better comfort throughout the procedure and less movement of the patient allowing for better visualization of the prostate during the biopsy. Most urologists provide local anesthesia of the prostate of which the most common type is peri-prostatic blockade. There is still some debate as to the best site for injection as well as the type and dosage of local anesthetic to use. Contemporary studies have suggested that combined anesthesia with peri-rectal anesthetic jelly/cream application and peri-prostatic block provides good pain relief by addressing sources of pain from both the rectal probe insertion and the biopsy itself. However, several studies have suggested that any form of local anesthesia is better than no anesthesia and urologists should use whatever method they are comfortable with. To not provide our patients with some form of local anesthetic for pain would be consider beneath most standards of care today.

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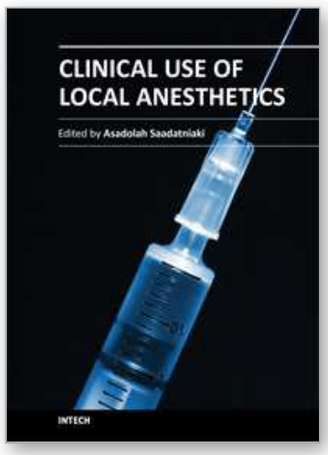

Clinical Use of Local Anesthetics

Edited by Dr. Asadolah Saadatniaki

ISBN 978-953-51-0430-8
Hard cover, 102 pages
Publisher InTech
Published online 23, March, 2012
Published in print edition March, 2012

Local anesthetics are being increasingly applied in different surgeries. Lower side effects of neuroaxial anesthesia, regional anesthesia, and field block, in comparison to general anesthesia (volatile and intravenous agents), are the main reasons why physicians prefer to conduct surgeries under local anesthesia, especially in outpatient and day care surgeries. It is important to emphasize the presence of an anesthesiologist, and vigilant monitoring of the homodynamic parameters, in decreasing a patient's anxiety, exerting other modalities for analgesia and increasing the safety margin in many procedures.

How to reference

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Allison Glass, Sanoj Punnen and Katsuto Shinohara (2012). Local Anesthesia for the Prostate Gland, Clinical Use of Local Anesthetics, Dr. Asadolah Saadatniaki (Ed.), ISBN: 978-953-51-0430-8, InTech, Available from: http://www.intechopen.com/books/clinical-use-of-local-anesthetics/local-anesthesia-for-prostate

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