

THE IMPACT OF SPINAL ANESTHESIA FOR DAY-CASE PROCEDURES ON BLADDER FUNCTION: IS THERE A GOOD PROTOCOL?

Marcel Vercauteren¹, Margaretha B. Breebaart¹,
Luc Sermeus¹

The impact of neuraxial techniques and substances commonly involved with them upon the function of the bladder is still subject of debate. With respect to bladder function this may be more challenging in day-case surgery as for longer-lasting surgery in hospitalized patients the threshold to place an indwelling catheter is lower. Voiding delay in day-case setting may affect the discharge time.

Even more than general anesthesia, the bladder function may be compromised by a neuraxial technique. The present manuscript will not discuss postoperative epidural analgesia during which patients may have received an indwelling urinary catheter at the surgeon's discretion and depending on the type of surgery. As epidurals are less commonly performed in day-case surgery, especially spinals have suffered in popularity due to their delay in bladder function recovery.

Most actual discussions have focused on the question whether anesthetists should wait until the moment the patient has voided, to allow home discharge. Although there has been some common agreement in the past that patients operated for uro-genital surgery, hernia repair, those who had experienced bladder problems in the past, patients with prostate disease, aged persons and those operated under a neuraxial technique should void before discharge, actually the latter indication seems to fade. Arguments in favor of this were series of patients sent home with only few requiring a single bladder evacuation later on. Several reports do no longer support the attitu-

1 Antwerp University Hospital, Belgium

de to keep the patient in the hospital if they were not able to void within the expected time interval (1-3). Some suggest patients to return to the hospital only when no voiding took place within 8 hours or until the evening of the day of surgery.

Full recovery of the bladder function requires recovery of the detrusor reflex (S3) which requires at least 2.5-3 hours regardless of the substance or dose used for spinal anesthesia. Another frequently discussed issue has been whether patients needing to void before discharge should receive a 'normal' or 'restricted' amount of intravenous and subsequently oral fluids. Restricting the fluid load will not fill the bladder and as a consequence the patient will feel the urge to void rather late in the postoperative period. Otherwise when freely allowing fluids (though prehydration is not really mandatory) the bladder may fill too early at the moment the patient is still anesthetized risking over-distension of the bladder. With the common policy to allow patients to freely drink clear fluids up to 2 hours before surgery, the bladder may fill intra-operatively regardless of restricted intravenous fluid administration. There is also disagreement at which bladder volume its content should be evacuated as this ranges from >300mL to >600mL (1,2,4). The risk of over-distension should be weighed against possible infection caused by bladder catheterization.

The use of bladder scanning has quantified more clearly the problem of postoperative voiding difficulty but has also some disadvantage that 'measuring is knowing'. It is clear that there is more than 'voiding' and 'no voiding' and that despite the fact that the patients claims to have voided, the post-voiding residual volume may be considerable. After optimal voiding it should be less than 25mL.

Several solutions have been suggested to accelerate voiding or reduce the incidence of urinary retention. These were lowering the local anesthetic (LA) dose (to extremely weak dose such as bupivacaine 3mg and lidocaine 20mg) while adding an adjuvant substance (5). However opioids will also affect bladder function, longer than some local anesthetics, while also clonidine may delay home discharge for other reasons such as sedation and hypotension. Adjuvant substances will decrease the sensation of bladder fullness and weak the detrusor contraction at the spinal but also at the central pontine level. As lowering the LA dose may risk possible failures, combined spinal-epidural (CSE) may provide beneficial to rescue a possible block failure though a more expensive solution. As lidocaine has been discarded due to transient neural syndrome (TNS) complaints and other LA, causing less or no TNS, have a duration of action which is too long for a day-case setting (bupivacaine, levobupivacaine and ropivacaine), unilateral blocks with hypo- or

hyperbaric solutions have been thought to reduce the bladder problems as only one side would be affected. There is still controversy whether this is really true (6,7). Older LA have also been proposed for day-case use such as chloroprocaine (as it is now available without preservative) (8,9) and prilocaine, actually available as a hyperbaric substance seeming to have a better daycase profile than the plain substance (10). Studies performed with the latter two substances were very promising as they have a rapid recovery time which may be translated in a faster recovery of qualitative voiding. However comparative studies with bupivacaine are obsolete because the superiority of the short-acting substances is predictable (11). The shortest time to micturition i.e. 103 minutes (as opposed to more than 400 minutes for bupivacaine) has been reported with chloroprocaine, but was achieved in volunteers (12). Unfortunately not all the studies with chloroprocaine and prilocaine were able to show any benefit with respect to bladder recovery (13,14). In the report by Kreuziger et al (14), 23% of the patients treated with hyperbaric prilocaine 60mg required urinary catheterization. Recently it was shown that plain articaïne has an even faster recovery profile than plain prilocaine (15).

In our department we have performed 3 studies during the last 10 years. The first compared lidocaine, ropivacaine and levobupivacaine (16). Patients were asked to void before transfer to the operating room and intravenous fluids were restricted to 500mL. The study demonstrated that the latter two LA prolonged home discharge with 40 minutes while more patients had micturition problems (subdivided in 5 subcategories). It was also found that mostly male patients had voiding with difficulty. Although this confirms previous reports (17), in the report by Kreuziger et al, significantly more females had to be catheterized (14). In a subsequent study in only males clonidine 30 μ g was added to a 25% lower dose of levobupivacaine (18). This did not affect voiding despite some shortening of the block duration but delayed discharge due to either sedation or hypotension. Especially when the local anesthetic dose is not lowered, addition of an adjuvant of any kind may improve block quality but will surely prolong the hospital stay. The most recent study has compared lidocaine and prilocaine with or without fluid loading or restriction. Voiding and discharge was faster with chloroprocaine while the hydration policy did not seem to influence voiding or discharge intervals. On the contrary, fluids allowed up to 700mL even accelerated discharge after chloroprocaine spinals, conforming the results by Orbey et al (19). Patients in our third study voided between 2.5-3 hours after the spinal at volumes between 330-430mL.

Very recently Choi et al (20) have written a review on bladder dysfunction

in the perioperative period, covering 94 studies (11162 patients) including spinals, epidurals and local infiltration, retrospective, prospective and volunteer studies. As a consequence, it was concluded that besides the effect of dose and potency of local anesthetics and adjuvants, it is extremely difficult to draw conclusions also because of additional reasons such as the heterogeneity of substances used, the differences in the definition of 'urinary retention' and the lack of comparisons with general anesthesia.

In conclusion, despite some arguments to stop focusing on bladder function after day-case surgery, it may be advisable to ask patients to void before the intervention, limit fluid intake before surgery, use short-acting local anesthetics and preferably monitor micturition and bladder volumes during the first postoperative hours. Based upon our results it may be unwise to send patients home without necessity to void when measuring a bladder volume of 400mL or more, requesting them to return after at least another 4–5 hours. Depending on bladder volume at discharge the interval allowed before return to the hospital should be calculated and told to the patient.

REFERENCES:

1. Mulroy MF, Salinas FV, Larkin KL, Polissar NL. *Anesthesiology* 2002; 97: 315–9.
2. Mulroy MF, Alley EA. *Int Anesthesiol Clin* 2012; 50: 101–10
3. Ng KO et al, *Acta Anaesthesiol Taiwan* 2006; 44: 199–204
4. Luger TJ, Garoscio I, Rehder P, Oberladstätter J, Voelckel W. *Arch Orthop Trauma Surg* 2008; 128: 607–12
5. Korhonen AM, Valanne JV, Jokela RM, Ravaska P, Korttila K. *Acta Anaesthesiol Scand* 2003; 47: 342–6
6. Esmaoglu A, Karaoglu S, Mizrak A, Boyaci A. *Knee Surg Sports Traumatol Arthrosc* 2004; 12: 155–8
7. Voelckel et al. *Anesth Analg* 2009; 109: 986–7.
8. Casati et al, *Anesth Analg* 2006; 103: 234–8
9. Sell A, Tein T, Pitkänen M, *Acta Anaesthesiol Scand* 2008 ; 52: 695–9
10. Camponovo c, Fanelli A, Ghisi D, Cristina D, Fanelli G. *Anesth Analg* 2010; 111: 568–72
11. Rättsch G, Niebergall H, Hauenstein L, Reber A. *Anaesthesist* 2007; 56: 322–7
12. Gonter AF, Kopacz DJ. *Anesth Analg* 2005; 100: 573–9.
13. Casati et al, *Anesth Analg* 2007; 104: 959–64
14. Kreutziger J, Frankenberger B, Luger TJ, Richard S, Zbinden S. *Br J Anaesth* 2010; 104: 582–6
15. Hendriks MP et al. *Br J Anaesth* 2009; 102: 259–63
16. Breebaart MB, Vercauteren M, Hoffmann V, Adriaenssen H. *Br J Anaesth* 2003; 90: 309–13
17. Linares Gil MJ et al, *Am J Surg* 2009;197: 182–8
18. Nelis A, Vercauteren M. *ESRA abstracts Athens 2004*
19. Orbey BC et al, *Tech Coloproctol* 2009; 13: 35–40
20. Choi S, Mahon P, Awad IT. *Can J Anaesth* 2012; april issue