Influence of Needle Type on Effectiveness and Incidence of Postoperative Complaints in Microcatheter Continuous Spinal Anaesthesia

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Introduction. Recent studies suggest a significant effect of the intrathecal position of microcatheters on efficacy and complications in continuous spinal anaesthesia (CSA). A cranial position of the microcatheter may be associated with faster onset of analgesia and with a lower dose requirement of local anaesthetics (LA) due to higher distribution of the LA thus making CSA more effective and reducing the risk of neurological damage caused by maldistibution. The present prospective randomized study was designed to examine the influence of a directional and a non-directional needle on dose requirement of LA and on time of onset of analgesia in CSA as well as the incidence of technical problems and postoperative complaints after CSA.
Methods. 41 orthopaedic patients (9 male, 32 female, mean age 73 ± 6 years) received CSA for elective surgery of the lower extremity. The lumbar puncture was performed in the sitting position at the L3/L4 interspace using the midline approach. The patients were randomly assigned to have a 28-gauge catheter (Cospan®, Kenadall, Mass.) placed using either a 22-gauge Quincke or a 22-gauge Sprotte needle. All catheters were inserted 2-4 cm intrathecally through the upward directed needle bevel. Problems with insertion of the catheters were registered. With the patients in the supine position, 2 ml of plain bupivacaine 0.5% were injected through the catheter and the time of onset of analgesia at the level of T 10 was recorded. If analgesia could not be established at T 10 within 20 min, additional doses of bupivacaine 0.5% were given until the level of T 10 or a maximal dose of 5 ml of the LA was reached. The time of onset of analgesia at T 10 and the required dose of LA for the block at T 10 were correlated to the needle type. On postoperative day 4, the patients were examined for postanaesthetic complications. The incidence of postoperative complaints was as well correlated to the needle type as the incidence of technical problems during catheter insertion. The data were tested for significance using the chi-square test and Fisher's exact test ($p < 0.05$).
Results. CSA was successful in all patients. Both groups did not differ significantly with respect to demographic data. There was a significantly higher rate of difficulties for the insertion of the catheters through Quincke needles compared to Sprotte needles ($p<0.05$). Onset of analgesia was significantly faster ($p<0.05$) and LA dose requirements were lower ($p=0.3$) in patients in whom Sprotte needles were used (table 1). However, there was no difference in incidence of postoperative complaints between both groups.

Needle type	Sprotte		Quincke	
Technical problems	no	yes	no	yes
	79%	21%	44% *	56% *
Onset of analgesia	< 20 min	> 20 min	< 20 min	> 20 min
	71%	29%	40% *	60% *
Dose of LA	< 3 ml	> 3 ml	< 3 ml	> 3 ml
	81%	19%	60%	40%
Headache	0%		0%	
Backache	18%		20%	
Urinary dysfunction	0%		0%	

Table 1: Comparison between two 22-gauge spinal needles with regard to effectiveness and complications in microcatheter CSA (numbers are percentages of 41 patients, * significant difference between groups of needle types)

Discussion. The present study shows that directional spinal needles such as Sprotte needles provide faster onset of analgesia and smaller dose requirement of LA. The data suggest a higher number of cranial positions in catheters inserted through Sprotte needles compared to catheters inserted through Quincke needles. More difficulties in catheter insertion were seen in the Quincke group. A higher incidence of contact between the catheter and the dura on the opposite side of the needle may be an explanation for these results in the Quincke group. With the exception of backache, no postoperative complaints were seen in both groups. However, PDPH normally is very rare in elderly patients. We conclude that directional needles may not only make microcatheter CSA more effective, but also more safe because of a lower rate of difficulties in catheter placement and a presumably higher rate of cranially directed catheters.

INFLUENCE OF TWO DIFFERENT TYPES OF SPINAL NEEDLES ON THE INTRATHECAL POSITION OF MICROCATHETERS IN CONTINUOUS SPINAL ANAESTHESIA

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Introduction. The techniques for continuous spinal anaesthesia (CSA) has been refined several times. Microcatheters have been shown to reduce the incidence of PDPH but were associated with technical problems and neurological complications. Data from recent studies suggest that both the baricity of the local anaesthetic and the intrathecal position of the microcatheter may influence the intrathecal distribution of the local anaesthetic. Cranial positions of spinal catheters seem to be associated with lower risk of maldistribution than caudal positions. The purpose of this present prospective randomized study was to evaluate the influence of two different types of spinal needles on the intrathecal position of 28 G spinal catheters.

Methods. 40 orthopaedic patients (9 males, 31 females) aged 56 -83 years (mean 73 years) scheduled for elective surgery of the lower extremeties were enrolled in the study. Lumbar puncture was performed between L2 and L5 with the patient in a sitting position. A 28 G spinal catheter was inserted 2-4 cm intrathecally through either a 22 G Quincke needle or a 22 G Sprotte needle. Additional doses of plain bupivacaine 0.5% were injected to achieve an analgesic level at T 10. After completion of surgery a dye supported x-ray of the lumbar spine was performed to identify the intrathecal position of the catheter. The entrance of the spinal catheter into the subarachnoid space and the intrathecal position of the catheter was evaluated and correlated to the needle type.

Results. Twenty patients were randomly allocated to each group. Demographic data and patients characteristics were not different between groups. CSA was sucessful in all 40 patients (table 1). There were significant correlations between the needle type and the intrathecal position of the catheter ($p < 0.01$). Furthermore, there were correlations between the intrathecal position of the catheters and the time of onset of analgesia at the intended level of T 10 ($p < 0.01$), the dose of local anaesthetic required to establish the block ($p=0.01$) and the maximal analgesic level ($p<0.05$).

Conclusions. The present study shows that the type of spinal needle used for microcatheter CSA may influence the intrathecal direction of the catheter. Slow onset of analgesia and a high dose requirement of local aneasthetic may indicate a caudal position of microcatheters in CSA. Our data suggest that Sprotte needles should be recommended in microcatheter CSA.

	Catheter position (n)		
	cranial	*level*	*caudal*
Spinal needle			
Sprotte-needle	12	8	0
Quincke-needle	8	5	7
n = 40			

Table 1: Intrathecal catheter position in 28 G microcatheter CSA (n = numbers)