

Analgesia after inguinal herniotomy in children: Combination of simplified (Single Puncture) ilioinguinal and iliohypogastric nerve blocks and wound infiltration vs. caudal block with 0.25% bupivacaine

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Abstract

Objective: To assess whether simplified ilioinguinal and iliohypogastric nerve block in combination with minimal wound infiltration with local anaesthetic is better than caudal block with local anaesthetic alone in children undergoing inguinal herniotomy for easy transition to safe oral analgesia. **Subject and Methods:** Sixty children of both sexes undergoing herniotomy were allocated randomly to receive either simplified (single puncture) ilioinguinal and iliohypogastric nerve block described by Dalens in combination with small volume wound infiltration with 0.1ml/kg of 0.25% bupivacaine (Group I) or caudal block with 1 ml/kg of 0.25% bupivacaine (Group II) at the end of surgery under general anaesthesia using halothane in oxygen and nitrous oxide mixture. Duration of analgesia, complication associated, parents and children's satisfaction were compared. **Results:** The mean duration of analgesia was 253±102.6 minutes in group I as compared to 219.6±48.4 minutes in group II. Six (20%) patients in group I and two (6.67%) patients in group II required parenteral analgesic. Complications and parents and children's satisfaction were comparable in both the groups. **Conclusion:** Simplified ilioinguinal and iliohypogastric nerve blocks described by Dalens in combination with small volume local anaesthetic wound infiltration with its longer mean duration of analgesia offers better safety margin to start oral analgesics than caudal block with local anaesthetic alone in children undergoing herniotomy. Larger studies may further confirm the findings.

Key words: Simplified ilioinguinal and iliohypogastric nerve blocks, wound infiltration, caudal block

Most of the surgeries in the present day world are being carried out under day care basis. Inguinal herniotomy is one of the commonest paediatric surgical procedures being carried out as day cases both in the developed as well as developing countries. However, availability of suitable post operative analgesics becomes one of the most important concerns in providing quality day care services.

Unavailability of short acting opioids and other analgesics due to cost and legal restrictions in developing countries like Nepal make it very difficult to manage intra and immediate post operative pain in day care setting.

Caudal analgesia with local analgesics alone is effective but is often short-lived and associated with undesired motor blockade and other complications. Addition of morphine to local anaesthetics provides long analgesia¹ but is associated with pruritis, post

operative nausea and vomiting, urinary retention² and respiratory depression³, making it a risky and unsuitable alternative for early discharge.

Simplified (single puncture) ilioinguinal and iliohypogastric nerve block has been described to provide effective analgesia in inguinal herniotomy⁴. Moreover, effective post operative analgesia has been reported with little need of opioids after wound infiltration using local anaesthetics⁵.

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The present study has been carried out to assess whether simplified ilioinguinal and iliohypogastric nerve block described by Dalens in combination with wound infiltration with local anaesthetic is better than caudal block with local anaesthetic alone in children undergoing inguinal herniotomy for easy transition to safe oral analgesia.

Subject and Methods

After institutional ethical clearance and informed consent, 60 children of both sexes undergoing inguinal herniotomy under general anaesthesia were randomly allocated into 2 groups using sealed envelope technique. Group I received simplified ilioinguinal and iliohypogastric nerve blocks (described by Dalens⁴) with 0.5 ml/kg of 0.25% bupivacaine using 23G, 1.5 inch long needle through the single puncture site close to anterior superior iliac spine inserting the needle at an angle of 45-60° while pointing to the midpoint of the inguinal ligament. Small amount of the solution (0.1 ml/kg) was infiltrated along the wound margin parallel to the incision through the same puncture site. Group II received caudal block with 1 ml/kg of 0.25% bupivacaine performed with standard technique in lateral position. Blocks in both groups were performed at the end of surgery under general anaesthesia using halothane in oxygen and nitrous oxide mixture delivered through Ayre's 'T' piece with Jackson Ree's modification. Airway was secured in all the children with appropriate sized LMA. Breathing was kept spontaneous. Intra-operative analgesia was provided by using 0.5 mg/kg of pethidine I.V. Full aseptic precautions were followed in performing the blocks.

All the patients were observed in the post-operative period by an observer unaware of the technique of

analgesia used. The time to first requirement of analgesia as demanded by bigger children (age \geq 5 years) or 3 point or more in the 6 points facial rating scale⁶ of pain for smaller children (age \leq 4 years), was used to assess the duration of analgesia. Minimum time for keeping nil orally in the post operative period was arbitrarily kept 3 hours (180 minutes) and oral analgesic syrup ibuprofen 10 mg/kg was allowed thereafter if required.

Any child requiring analgesics before 180 minutes from the time of blocks were given Inj. Ketorolac 0.7mg/kg IV.

Presence of significant muscle weakness was assessed at 3 hours after the block using four P's (push, pull, pinch, punt) method described by Neal⁷.

The assessment of the acceptability of the technique was done by asking parents and bigger children (age \geq 5 years) whether they would accept the same technique of analgesia for similar surgeries in future if required.

Data was recorded using a preformed proforma. Continuous data was analyzed using students 'T' test and categorical data using 'Chi' square tests. P-value of less than 0.05 was taken as significant.

Results

All together 60 children were enrolled, 30 in each of the group I and II. Fifty were male children and 10 female with the age range from one year to 14 years. There was no difference in the demographic characters of the patients between the groups (table 1).

Table 1: Demographic data

	Group I (n=30)	Group II (n=30)	Significance
Mean age \pm SD (years)	6.7 \pm 3.7	7.5 \pm 3.3	NS
Range (years)	1-14	2-12	
M:F	26:4	24:6	
Weight \pm SD (Kg)	19.5 \pm 9.0	19.1 \pm 9.0	NS

NS: Not significant (P > 0.05)

The mean duration of analgesia was longer in group I - 253 \pm 102.6 min. as compared to 219.6 \pm 48.4 min. in group II. But the duration was more variable in group I as compared to group II. Six patients (20%) in

group I and 2 (6.67%) in group II had duration of analgesia less than 180 minutes and required parenteral analgesic. (Table 2)

Table 2: Duration of analgesia

	<i>Group I (n=30)</i>	<i>Group II (n=30)</i>	<i>Significance</i>
Mean±SD (min)	253.2±102.6	219.6±48.4	NS
Pain relief for <180 mins	6 (20%)	2 (6.6%)	NS

NS: Not significant ($P > 0.05$)

There was no difference in the observed complications viz PONV and tachycardia between the groups. None of the patients of either group had any motor weakness at 3 hours (Table 3). Similarly

no significant difference was found in the acceptance of both the techniques by both the parents and children (Table 4).

Table 3: Frequency of complications observed during first 3 hours after blocks

<i>Complication</i>	<i>Group I (n=30)</i>	<i>Group II (n=30)</i>	<i>Significance</i>
PONV number (%)	3 (10%)	4 (13.3%)	NS
Tachycardia number (%)	7 (23.3%)	8 (26.7%)	NS

NS: Not significant ($P > 0.05$)

Table 4: Acceptance of the techniques by the parents and children in Number (Percentage)

	<i>Group I</i>	<i>Group II</i>	<i>Significance</i>
Parents	28 (93.3%) (n=30)	26 (86.7%) (n=30)	NS
Children*	16 (72.7%) (n=22)	18 (75%) (n=24)	NS

* children <5 years excluded

NS: Not significant ($P > 0.05$)

Discussion

Despite wide practice of day care surgery in developing countries, availability of suitable analgesics is still a problem due to cost and legal restrictions. Lack of suitable analgesics coupled with lack of quick communication means (e.g. telephone & transport) pose challenge to the practising anaesthesiologist to conduct anaesthesia in day basis in developing countries like Nepal.

This study examined the suitability of modified ilioinguinal and iliohypogastric nerve blocks described by Dalens in combination with wound infiltration by comparing it with the caudal block with 0.25% of bupivacaine. Wound instillation alone has been shown to be effective but until only 2 hours after surgery⁸ while other authors^{9, 10} have reported comparable effect of wound instillation and ilioinguinal and iliohypogastric nerve blocks.

Along with the Dalen's approach to ilioinguinal and iliohypogastric nerve block we have used small amount (0.1 ml/kg of the same solution) of local anaesthetic for wound infiltration anticipating that the effect of the combination can be better.

Our study showed that the mean duration of analgesia is longer with the simplified ilioinguinal and iliohypogastric nerve block plus local infiltration as compared to caudal block with 0.25% bupivacaine. This can be expected as uptake of drug is faster from the epidural space. However, the wider variability of duration in group I can be due to the fact that it may not be always possible to locate the exact site of the nerve fibres in blind techniques.

Adding morphine to the local anaesthetic for the caudal block can prolong the duration of analgesia but at the cost of side effects² and dreaded respiratory depression³ making it an unsuitable choice for day care surgery. These effects hinder early discharge of the patients.

The side effects in both the groups were not different in our study. Similarly acceptability of the technique was similar in both the groups.

Although ilioinguinal and iliohypogastric nerve blocks are considered easy and virtually free from true complications, alarmingly high concentration of bupivacaine¹¹ and undesired transient femoral nerve

blocks have been reported¹² warranting more caution in its use.

Modified ilioinguinal and iliohypogastric nerve blocks described by Dalens in combination with small volume local anaesthetic wound infiltration with its longer mean duration of analgesia offers better safety margin to start oral analgesics than caudal block with local anaesthetics alone following herniotomy in children. It is more likely to be safe and useful for day case surgery in a country like Nepal with majority of people having no access to telephone and easy transport after being discharged from the hospital. Larger studies may further confirm the findings.

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