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## Research Article

# Paediatric Analgesia during Inguino-Scrotal Surgery- A Pilot Study

### Abstract

**Introduction:** There are many different analgesic methods used for children undergoing inguino-scrotal surgery. Research suggests that caudal analgesia reduces the need for postoperative pain relief in these children compared with regional techniques but may increase the risk of motor block and urinary retention. This can be problematic given that these procedures are commonly performed as day cases.

**Primary Aim:** Assess post-operative pain requirements of the three different analgesic methods used at Medway Maritime hospital in paediatric surgery patients undergoing inguino-scrotal surgery.

**Secondary Aim:** Assess whether there were any differences between these methods in rates of post-operative complications, including time before spontaneous leg movement, micturition, rates of nausea and vomiting and time to discharge.

**Methodology:** This study prospectively recruited paediatric surgery patients undergoing elective day case inguino-scrotal surgery at MMH between May and July 2015.

Three analgesic methods were employed:

Group 1.IG/IH under ultrasound guidance (10mls, 0.25% levobupivacaine) + direct intra-operative GF block (2mls, 0.25% levobupivacaine)

Group 2.Caudal (1.5ml/kg, 0.125% levobupivacaine) + clonidine (1.5mcg/kg)

Group 3.Local infiltration (2mg/kg, 0.5% levobupivacaine) with intra-operative morphine (100 micrograms/kg).

**Results:** 26 patients (24 boys, 2 girls) were recruited over a time period of two and a half months. Only one patient from group 1 and one patient from group 2 had positive pain scores, whereas five patients in group 3 had positive pain scores. There was no clinically significant difference in time before first leg movement or micturition between the three groups.

**Conclusion:** Our pilot study suggests that a direct intra-operative block of the GF nerve with a pre-operative IG/IH nerve block provides the same level of postoperative analgesia as a caudal block but without increasing post-operative complications.

## Abbreviations

APAGBI: Association of Paediatric Anaesthesia of Great Britain and Ireland; IG/IH: Ilioinguinal/Iliohypogastric; GF: Genitofemoral; LA: local anaesthetic; MMH: Medway Maritime Hospital; USS: Ultrasound;

## Introduction

There are many different analgesic methods used for children undergoing inguino-scrotal surgery. Research suggests that caudal analgesia reduces the need for postoperative pain relief in these children compared with regional techniques but may increase the risk of motor block and urinary retention [1]. This can be problematic given that these procedures are commonly performed as day cases. Some studies suggest that the use of additives, such as clonidine prolongs and can potentiate analgesic effects [1,2].

The Association of Paediatric Anaesthesia of Great Britain and Ireland (APAGBI) has recommended the use of local infiltration, ilioinguinal nerve block or caudal analgesia with 0.25% levobupivacaine in children having inguinal hernia repair and states

that there is no postoperative advantage of adding a pre-operative genito-femoral nerve block [3]. At Medway Maritime hospital, three main analgesic techniques tend to be used: Ilioinguinal/Iliohypogastric (IG/IH) + direct intra-operative block of the genital branch of the genito-femoral nerve (GF), caudal analgesia with clonidine and local infiltration with intra-operative morphine. Our aim was to perform a pilot study to look at the effectiveness of these three analgesic techniques.

### Primary aim

Assess post-operative pain requirements of the three different analgesic methods used at Medway Maritime hospital in paediatric surgery patients undergoing inguino-scrotal surgery.

### Secondary aim

Assess whether there were any differences between these methods in rates of post-operative complications, including time before spontaneous leg movement, micturition, rates of nausea and vomiting and time to discharge.

## Materials and Methods

This study prospectively recruited paediatric surgery patients undergoing elective day case inguino-scrotal surgery at our unit between May and July 2015.

Three analgesic methods were employed:

Group 1. IG/IH under ultrasound guidance (10mls, 0.25% levobupivacaine) + direct intra-operative GF block (2mls, 0.25% levobupivacaine).

Group 2. Caudal (1.5ml/kg, 0.125% levobupivacaine) + clonidine (1.5mcg/kg).

Group 3. Local infiltration (2mg/kg, 0.5% levobupivacaine) with intra-operative morphine (100 micrograms/kg).

All children received a standardised anaesthetic regime. This included intra-operative Hartmann's solution in boluses of 20mls/kg, intra-operative fentanyl (2mcg/kg), paracetamol (15mg/kg) and ondansetron + dexamethasone (0.1mg/kg). The three analgesic methods detailed above were compared. Pain scales as validated by the APAGBI were used to measure post-operative pain immediately after recovery and subsequently on the post-operative recovery ward. These included the Face, Legs, Activity, Cry, Consolability, (FLACC) behavioral tool and the visual analogue scale (VAS) for nonverbal and verbal groups of patients respectively [3]. Use of rescue analgesia (200mcg/kg oramorph), rates of nausea and vomiting, time before leg movements, micturition and time before discharge were also recorded. The criteria for giving post-operative analgesia was based on clinical assessment, combining results from both FLACC and VAS tools. Parents /guardians of the patients were given an information leaflet regarding the study pre-operatively and gave their consent for their data to be used. Ethics committee approval was not sought as this was an evaluation of a routine procedure already carried out in the trust. No patients within this are identifiable, and there was no change to routine practice. Treatment in the form of surgery and anesthesia had already been decided prior to the patient entering the operating theatre and therefore this study was exempt from needing approval.

## Results

26 patients (24 boys, 2 girls) were recruited over a time period of two and a half months. The median age of the children was 3 years and 6 months (range 5 months to 12 years). The operations for each group are shown in **Table 1**.

Only one patient from group 1 and one patient from group 2 had positive pain scores, whereas five patients in group 3 had positive pain scores. Post-operative analgesia was required by one patient from group 1, one patient from group 2 and two patients from group 3 (**Figure 1**). Postoperative nausea and vomiting was experienced by no patients in group 1, one patient in group 2, and three patients in group 3 (**Figure 1**). One patient from Group 3 vomited four times and required post-operative dexamethasone to control their symptoms. One patient in the LA + morphine group was kept in overnight because of pain. As a result, Group 3 had the longest average time before discharge (**Figure 2**). All the other patients were day case

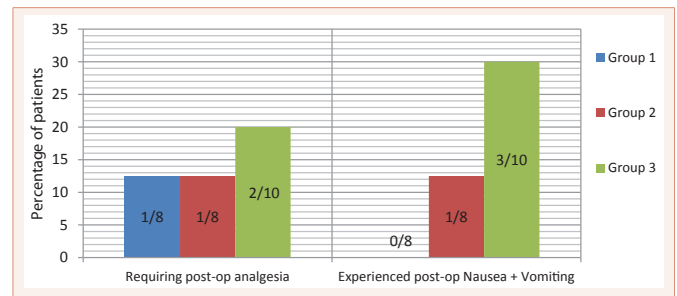
procedures. There was no clinically significant difference in time before first leg movement or micturition between the three groups (**Figure 2**).

## Discussion

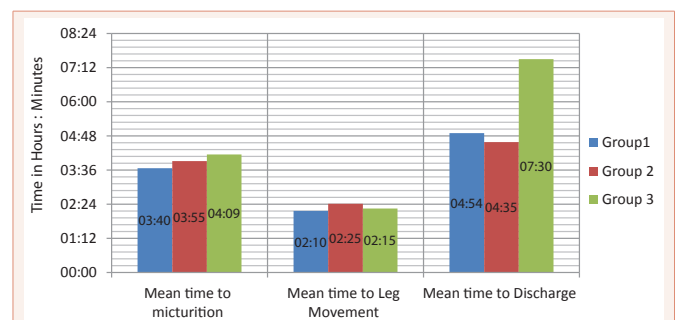
The results from this study suggest that a direct intra-operative block of the GF nerve, in addition to an IG/IH nerve block provides the same level of postoperative analgesia as compared to caudal block. Moreover it does this without increasing post-operative complications in our local population group. This is in contrast to recommendations by the APAGBI which has found no post-operative advantage in adding a GF nerve block. This may be in part because of the different techniques used to block the GF nerve. The APAGBI bases its recommendation on a study led by Sasoka et al. [4]. The patients in their study had their GF nerve block preoperatively with no use of ultrasound guidance which may have reduced its true

**Table 1:** Number of children for each type of surgery across the three analgesic groups.

	Group 1 IG/IH + GF	Group 2 Caudal + clonidine	Group 3 LA + morphine
Median age (years)	7 (2 to 12 years)	3 (5 months to 10 yrs)	2 (1 to 7 years)
Type of Surgery			
Herniotomy	4	2	3
Ligation of PPV	2	0	1
Orchidopexy	2	5	5
Bilateral orchidopexy	0	1	1
Total number	8	8	10



**Figure 1:** Percentage of patients in each group requiring post-operative analgesia and percentage of patients with post-operative nausea and vomiting.



**Figure 2:** Mean time for each group before post-operative micturition, leg movement and discharge (hours: minutes).

efficacy. In the MMH study, the GF nerve block was performed by the surgeon intra-operatively under direct vision. This technique could allow for smaller doses of local anaesthetic to be used which would reduce the risk of causing local anaesthetic toxicity and of inadvertently blocking the femoral or obturator nerve. Moreover by reducing the concentration of Levobupivacaine to 0.125% as opposed to 0.25% in caudal block, it provides adequate analgesia with minimal motor blockage suitable for day case surgery. Addition of clonidine prolongs the duration of the block [1,2].

Our results demonstrate that there was no difference between the three patient groups in time before micturition or spontaneous return of leg movement and so these were not factors in prolonging discharge. The length of time post-operatively that patients demonstrated adequate leg movements was over two hours in all three groups (Figure 2). The only cause of delay before discharge was due to poorly controlled pain (Group 3). This is in contrast to research conducted by Fell et al, which found a higher rate of delayed discharge secondary to lower leg weakness in patients who had had a caudal block, as compared to local infiltration [5].

Due to the small sample size of the study, these results are not statistically significant. However it does generate two hypotheses. Firstly, a direct intra-operative block of the GF nerve in addition to

a IG/IH nerve block provides a postoperative analgesic advantage. Secondly, using 0.125% Levobupivacaine with the addition of clonidine in caudal analgesia allows for smaller concentrations of local anaesthetic to be used which reduces the time before micturition and return of lower limb motor activity. Nonetheless, further well controlled research is needed to better assess these theories before any accurate conclusions can be drawn.

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