

# Herniotomy in Children Under Intravenous Ketamine and Local Anesthesia

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## Abstract

This is a review of 197 patients of inguinal hernia operated at the Indian Institute of Medical Science and Research, Warudi over a period of 6 years. Ketamine is a rapid acting potent analgesic agent, that is safe, effective and with no respiratory depression. Herniotomy is a simple procedure recommended for children with inguinal hernia. It can be safely done under sedation with local Anesthesia using ketamine. In this study intravenous (i.v.) ketamine was given at dose of 2 mg/kg and local infiltration was done with 1% lignocaine solution. Patients were kept on spontaneous respiration with oxygen by face mask.

**Keywords:** Herniotomy, ketamine, local Anesthesia

## Introduction

Repair of congenital groin hernia or hydrocele is the most common surgical procedure performed by paediatric surgeons.<sup>1</sup> Inguinal hernia in the paediatric age group is commonly diagnosed by clinical examination.<sup>2</sup> Herniotomy can be safely done in paediatric patients under i.v. ketamine with local infiltration with lignocaine.<sup>3</sup>

In majority of the paediatric inguinal hernias, herniotomy alone is adequate but some patients

with larger hernia and wide internal ring may need narrowing of the internal ring or even repair of posterior wall in addition to herniotomy. Nyhus classification assigns the patients for the procedure depending on clinical and operative findings.<sup>4</sup>

**Table 1:** Nyhus classification

Hernia type	Procedure assigned for
Paediatric Nyhus 1 (PN1)	Herniotomy alone
Paediatric Nyhus 2 (PN2)	Herniotomy + deep ring narrowing
Paediatric Nyhus 3 (PN3)	Herniotomy + posterior wall repair

## Materials and Methods

A review was done of patients of hernia operated at this institute over a period of 6 years, between 1<sup>st</sup> January 2012 and 31<sup>st</sup> December 2018. A total of 963 patients of inguinal hernia were operated of which 197 were paediatric patients of age less than 12 years. 163 patients had herniotomy done under i.v. ketamine and local Anesthesia. 34 patients were done under spinal Anesthesia.

Patients were premedicated with injection midazolam 0.05 mg/kg. Injection ketamine 2 mg/kg was given. Patients were kept on spontaneous ventilation with oxygen via face mask. Out of 163 patients only 4 patients required intubation and muscle relaxants. The rest of the patients were maintained on spontaneous respiration throughout the procedure. Local infiltration was done at the surgical site with 1% lignocaine.

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## Results

76 patients were less than 5 years of age. 89 patients were between the age of 5 to 10 years and 32 patients were between 10 to 12 years (Table 2).

**Table 2:** Age wise distribution of patients

S. No	Age (in years)	Number of patients
1	<5	76
2	5-10	89
3	10-12	32

Sixty-five patients had herniotomy without opening of the inguinal canal. In 132 patients inguinal canal was opened to reach the internal ring for ligation of the sac. Herniotomy was done in 193 patients while herniotomy with repair of posterior wall was done in 4 patients (Bassini's repair) where the posterior wall appeared weak with a defect. Out of 132 patients who needed opening of inguinal canal, only 4 needed repair (Table 3).

**Table 3:** Procedure done for hernia

S. No	Procedure	Number of patients
1	Herniotomy alone	65
2	Herniotomy with narrowing of deep ring	128
3	Herniotomy with repair of posterior wall	4

## Discussion

Herniotomy is the most common procedure performed by paediatric surgeons. Ketamine administered systemically is a potent Anesthetic and analgesic. Hernia operation can be safely done in paediatric patients under intravenous ketamine and local infiltration with lignocaine.<sup>3</sup>

Paediatric Anesthesia is as challenging for the Anesthesiologist as paediatric surgery is for surgeons. Ketamine is a non-competitive antagonist at the NMDA receptors.<sup>4</sup> It produces a 'dissociative anesthesia' as a result of functional dissociation between cortical and limbic systems.<sup>5</sup> Protective airway reflexes and spontaneous respiration are not depressed with use of ketamine.<sup>6</sup> Hence endotracheal intubation is often not required. Ketamine is a potent analgesic with rapid onset of action.<sup>7</sup> Use of benzodiazepines reduces the sympathomimetic effects of ketamine<sup>8</sup> and is also effective in reducing emergence phenomenon produced by ketamine. I.v. ketamine can also be used for perioperative pain management.<sup>9</sup>

In younger children, less than 5 years of age, the inguinal canal is short and external and internal inguinal rings are almost overlapping. Hence the neck of the sac which lies at the internal ring can be reached in most of the cases without opening the inguinal canal. But in older children inguinal canal has to be opened in order to reach the internal ring.

The rate of recurrence of hernia in children after herniotomy is low but at least one year Follow-up is needed to rule out recurrence. Inguinal hernias have a significant risk of complication, hence early surgical intervention is needed.<sup>11</sup>

In our series, majority of the paediatric herniotomies were done with i.v. ketamine and local Anesthesia with no significant complications. Only 4 patients who needed repair of the posterior wall required use of muscle relaxants and intubation. Some selected patients like older children were given spinal Anesthesia. I.v. ketamine with local Anesthesia is a safe technique with rapid recovery and minimal side effects and can serve as an alternative to deep sedation.<sup>12</sup>

## Conclusion

Herniotomy is a very common procedure in paediatric patients. Early operation is needed as there is significant rate of complication in herniotomy. General Anesthesia with intubation and muscle relaxation can be avoided in children and i.v. ketamine with lignocaine infiltration can be used as an alternative, which is safe and effective for herniotomy in children.

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