

## Anaesthesia for Mitrofanoff Procedure in a young male patient with exstrophy-epispadias complex

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**Purpose:** One of the most challenging tasks of an anaesthesiologist is intraoperative and postoperative pain management. The exstrophy-epispadias complex is a congenital distortion not only of the genitourinary system but also the muscles of the wall of the abdomen and structures of the pelvis. The focus of surgical repair remains on bladder reconstruction and its surrounding structures with cosmesis and a better quality of life.

**Features:** A twenty-year-old male, known case of exstrophy-epispadias complex, presented for Mitrofanoff repair for recurrent urinary tract infections. This case report highlights the use of lumbar epidural infusion of local anaesthetic bupivacaine and opioid fentanyl with general anaesthesia for Mitrofanoff procedure in urinary bladder exstrophy-epispadias surgery.

**Conclusion:** Regional anaesthesia along with general anaesthesia has advantages such as decreased use of anaesthetic drugs intraoperatively, better haemodynamics, effective analgesia both intraoperatively and postoperatively. Although there have been differences in opinion on the usage of opioids in epidurals, it has been shown to facilitate early gastric motility, better analgesia and better recovery profiles.

**Keywords:** analgesia; bladder exstrophy; epidural; fentanyl; Mitrofanoff procedure; nausea; opioids; vomiting

### Introduction

Bladder exstrophy is an uncommon congenital anomaly of the genitourinary system which occurs in approximately one per 50,000 live births.<sup>1</sup> The most grievous form of midline abdominal defects is the exstrophy-epispadias complex (EEC) which includes the urinary system, the wall of the abdomen, pelvis and its' floor, the musculoskeletal system, the external genitalia and less commonly the spine and anus.<sup>2</sup>

It is a daunting task to manage bladder dysfunction. It is complex and children or adults undergoing this problem face many challenges in the pursuit to maintain or preserve bladder

continence.<sup>3</sup> These patients require multiple corrective procedures to obtain functionality and cosmesis, hence a multi-disciplinary team consisting of medical physicians, surgeons, anaesthesiologist, psychologists or psychiatrists and nursing care team is mandatory.

After the classical technique was described by Mitrofanoff<sup>3</sup> in 1980, numerous variations have been reported as the procedure has evolved over time, but the basic principles of a Mitrofanoff procedure include creating a conduit that goes into a low pressure reservoir, which can be accessed via a stoma that facilitates clean intermittent catheterization.<sup>4</sup> Some of the important indications are refractory idiopathic and neurogenic bladder dysfunction, congenital urogenital abnormalities such as cloacal exstrophy, epispadias, posterior urethral valves, prune belly syndrome and in severe urethral stricture disease.

Epidural anaesthesia with local anaesthetics have been shown to provide profound analgesia both intraoperatively and postoperatively without complications like respiratory

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depression. Adding adjuncts like opioids, Alpha agonists or preservative free ketamine causes prolongation of the analgesia.<sup>5</sup> Local anaesthetics given epidurally attenuates painful afferents going to the central nervous system and adding an opioid to it synergizes the analgesic effect.

**Case Report**

A 20-year-old male, known case of bladder exstrophy-epispadias complex since birth came with complaints of recurrent urinary tract infection. He had undergone two stage repair for the same at the age of one and three months of life under general anaesthesia. He was anxious regarding his condition and preoperatively was given several counselling sessions by the operating surgeon as well as a psychiatrist. He was well built and nourished. Scar of the previous surgeries were visible in the lower abdomen with pubic diastasis. He was now posted for Mitrofanoff procedure in view of his recurrent urinary tract infections which required clean intermittent catheterizations (CIC) to prevent post void residue and further urinary tract infections. CIC is painful with a sensate urethra and hence Mitrofanoff procedure was done.

*Anaesthetic management*

A thorough preanaesthetic assessment was done, and the patient was considered fit for surgery by a combined team of specialists who were involved in the workup of this patient. A written informed consent was taken.

He was brought to the operating room (OR), on the day of surgery, an appropriate intravenous cannula was placed, fluid started, and general anaesthesia was given. After induction of general anaesthesia, epidural catheter was placed at L3-4 level. Since the patient had undergone multiple procedures since childhood, he was anxious and requested if epidural could be done after general anaesthesia. Intraoperatively an infusion with 0.25% bupivacaine at the rate of 5ml/hour was initiated. Surgery was performed in the supine position. There was minimal blood loss. Reversal of residual neuromuscular blockade was done at the end of surgery and the patient was extubated. The reasons for use of muscle relaxation were duration of surgery and there was a lot of scar tissue from previous surgeries and adhesions intra-abdominally. The

surgical Mitrofanoff procedure was uneventful and a successful conduit was created (Figure 1).

**Figure 1:** Figure showing Appendix with vascular pedicle before the conduit created. Here the appendix was used to create a conduit between the bladder and surface of the skin called appendicovesicostomy



Postoperatively, analgesia was provided with infusion of 0.125% bupivacaine with fentanyl 2 mcg/kg at the rate of 5 ml/hr. The patient had minimal pain postoperatively with Visual Analogue score (VAS) of 0-2 immediately after surgery. He complained of motor weakness in his right lower limb 8 hours postoperatively and hence the infusion concentration was decreased to 0.0625% with fentanyl 1mcg/kg and was advised to move limbs from side to side. His motor power recovered with minimal pain VAS 0-2 (Table 1).

**Table 1:** Pain scores on post-operative days using VAS

	VAS Score (8 am- 8 pm)	VAS Score (8 pm- 8am)
POD 0	0	0
POD 1	1	3
POD 2	2	2
POD 3	1	1
POD 4	0	0
POD 5	1	0

His urine output was adequate. On postoperative day (POD) 1, he had an episode of vomiting (34 hours after surgery). Suspicion of early adhesive intestinal obstruction was considered. Following morning (POD 2) he continued to have 3 episodes of vomiting with mild abdominal distension and epigastric pain. This was treated conservatively with IV fluids and laxatives. His pain subsided and his obstruction was relieved the following day (POD 4). He complained of no pain at the surgical site. The epidural catheter was removed on POD 5 and he was put on IV

paracetamol 1 gram thrice a day. He was discharged a week after surgery.

### Discussion

Epidural analgesia for exstrophy-epispadias complex surgery along with general anaesthesia is a commonly used anaesthetic modality over the recent years.<sup>5,6</sup>

Advantages of epidural analgesia are pain relief, decreased need for narcotics and hence decreased incidence of nausea, early return of bowel function, decreased changes in normal physiology, an awake and alert patient and faster mobility by earlier participation in physical therapy.<sup>5</sup>

General anaesthesia along with continuous epidural block provides counterpoise anaesthesia and optimal postoperative analgesia<sup>7</sup>. The number of days that epidural infusions are kept postoperatively ranges from 4-30 days<sup>8</sup> and 8-42 days<sup>5</sup> as given in some studies. Continuous local anaesthetic epidural infusions with or without opioids have been used to provide adequate pain relief with meagre systemic side effects like sedation, itching, nausea and vomiting, depression of respiration postoperatively.<sup>5,8</sup>

A Cochrane Review<sup>9</sup> concluded that an epidural with a local anaesthetic facilitated the return of bowel movement by approximately 17 hours. It was suggested that adding an opioid to a local anaesthetic improves the quality of analgesia without interfering in gastrointestinal transit. Based on 22 trials including 1154 participants, no difference in incidence was found with regard to vomiting within 24 hours.

There are several advantages documented with using epidural analgesia with general anaesthesia such as avoidance of parenteral opioids, reduced requirement of inhalational anaesthetics, decreased hemodynamic response to incision and surgical stimulus<sup>7</sup> and allows for early extubation. A meta-analysis<sup>10</sup> done on the postoperative epidural analgesia effectiveness found that in pelvic surgery, the greatest improvement with respect to incident pain was produced by lumbar epidural analgesia with opioid.

In conclusion, epidural local anaesthetic analgesia with opioid definitely shows clinically significant improvement in postoperative pain control. It also provides better pain relief

outcomes during incident pain and causes minimal side effects.

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