

## Perioperative Anaesthetic Management of Bladder Extrophy Patient

Sonal Shah<sup>1\*</sup>, Anisha Chokshi<sup>2</sup>, Bharat Shah<sup>3</sup>, Mrunalini Patel<sup>4</sup>, Parth Shah<sup>5</sup>

<sup>1</sup> Tutor and 3<sup>rd</sup> year resident, <sup>2</sup> Associate Professor, <sup>3</sup> Dean and Professor, <sup>4</sup> Asst. Professor, <sup>5</sup> 3<sup>rd</sup> year resident, Department of Anaesthesia, B.J. Medical College, Ahmedabad.

### ABSTRACT:

Reconstruction of bladder extrophy in infants and small children requires immobilization, sedation and pain management to prevent distracting forces from compromising the repair. We present 15 cases operated for bladder extrophy in paediatric surgery workshop in January 2016. All Patients underwent surgery under combined epidural and general anaesthesia technique. Tunnelled epidural catheters were inserted in all patients and intermittently injected Inj. Bupivacain 0.25% (1ml/kg body weight). Postoperatively a continuous infusion with Inj. Bupivacaine and Inj. Dexmedetomidine was administered with syringe pump for 5 days. Intravenous fluid management was done with clinical parameters, counting the wet mobs and proper vigilance. Blood transfusion was given at the time of osteotomies. Perioperative management with tunnelled epidural catheter were resulted in an excellent cosmetic repair and pain relief with no case of bladder prolapse or wound dehiscence.

**Keywords:** Caudal Catheter, Dexmedetomidine, Infant, Local Anaesthetic Drug.

### Introduction

Bladder extrophy is a rare congenital anomaly of the genitourinary system with an estimated incidence of approximately 1 in 50,000 live births<sup>1</sup>. Most patients with this disorder will undergo multiple corrective surgeries. Most bladder extrophy patients require closure of the bladder and abdominal wall and an approximation of pelvic rami<sup>2</sup>. Post-operatively children are immobilised in order to promote healing and to maintain pelvic ring integrity for several days. Pain management of these patients is challenging job for anaesthetists.



Other congenital anomalies like cardiac, renal and spine abnormalities should be ruled out. Prolonged anaesthesia time requires eternal vigilance. Intra and post operative pain management can be managed with general anaesthesia and tunnelled caudal epidural catheterisation<sup>3</sup>. Use of warm blankets is important to avoid hypothermia. Temperature should be maintained around 32°C. Intravenous fluid management can be done with central venous pressure monitoring and other clinical parameters. Post operative pain management and sedation require for these children to prevent distracting forces from compromising the repair.

\* Corresponding Author:

Dr. Sonal Shah,  
E-mail: drsonalshah203@gmail.com

**Image 1 Patient with Bladder Exstrophy**



**Image 2 Separation of Pubic rami  
Anterior abdominal wall defect**



**Materials and Methods:-**

This retrospective analysis included 15 patients who underwent classic bladder exstrophy repair with closure of bladder and anterior abdominal wall and approximation of pubic rami with osteotomy and external fixator at Civil hospital Ahmedabad in Paediatric surgery workshop in January-2016.

**Table 1: Age and Weight distribution**

Group	Age	Weight	No. of Patients
1	6 months to 2 years	3 to 10kg	6
2	2 years to 5 years	10 to 15kg	7
3	5 years to 7 years	15 to 25kg	2

**Goals of Anaesthesia management**

- Safety considering proper history and thorough physical examination.
- Prolonged anaesthesia time requiring eternal vigilance.
- Avoid hypoxia, hypercarbia, hypothermia, hypovolemia, hypervolemia and light plane of anaesthesia.
- Use of warm blankets to avoid hypothermia
- Intra and postoperative pain relief to avoid haemodynamic instability.
- Intra-operative blood loss and accordingly fluid and blood management.
- Prevention of post operative catheter site infection and change of dressing every day.
- Avoid local anaesthetic toxicity<sup>4</sup> by avoiding high doses (toxic dose of bupivacaine is plasma level >3microgram/ml).

**Technique of Anaesthesia:-**

Evaluation of all patients preoperatively for complete care. With all patients we tried to establish a good rapport not only with the child but also with the child's parents or guardians with the help of paediatric surgeon. We obtained a complete and detailed history regarding the present complaints and birth history and other medical conditions if any. We did thorough physical examination of each child. The goal of the physical examination was to identify the current surgical issues and to ensure that the organ systems other than the one being treated were healthy. Cardiovascular and respiratory systems were examined for any anomalies. Assessment of an airway was done.

Laboratory studies included complete blood count, electrolyte tests, and coagulation studies. Blood was typed and screened for intra-operative blood transfusion, special investigations like echocardiography and spine X-rays were done. Both were normal in all patients.

All patients were kept nil per oral 6 hrs prior to surgery. Consent was obtained from parents or guardians for the procedure like caudal catheterisation and discussed the indication for the same and importance of perioperative pain relief. Also explained alternatives to the procedure, potential risks and complications like infection at catheter site.

On the day of surgery patients were reassessed for upper respiratory tract infections. Conventional general anaesthesia was given<sup>5</sup> Considering length of surgery and amount of blood loss intravenous line of 24g and 22g inserted. Premedicated with Inj. Glycopyrrolate 5 µg/kg, Inj. Midazolam 0.02 mg/kg and Inj. Fenatnyl 1µg/kg. Aspiration prophylaxis done with Inj. Ondansetron. Monitors were applied as pulse oximetry, ECG (electrocardiography), NIBP (non-invasive blood pressure) and temperature probe.

Induction done with Inj. Thiopentone sodium 5-7 mg/kg and Inj. Suxamethonium was given 2mg/kg to facilitate endotracheal intubation with uncuffed tubes. Maintenance was done with the help of O<sub>2</sub> + N<sub>2</sub>O+ Sevoflurane as an inhalation anaesthetic agent.

After induction lateral decubitus position was given for caudal catheterisation<sup>7</sup>. A dry gauze swab was placed in the anal cleft of betadine. A sterile skin preparation and drapping of the entire region was performed. 18G touhy needle was inserted using lateral approach into the caudal canal and identified epidural space. Epidural catheter was inserted upto T10 level and needle was withdrawn. Subcutaneous tunnelling was done upto Anterior superior iliac spine and fixation was done.

Drug was given for intra-operative pain management. 0.25% (0.5mg/kg) and (1ml/kg body wt) Bupivacaine. Patient was made supine and maintained with O<sub>2</sub>+ N<sub>2</sub>O+ Sevoflurane + Inj. vecuronium as muscle relaxant. IV Fluid management was done with clinical parameters according to 4/2/1 formula. Blood transfusion was started during osteotomies. Approximate blood loss was measured by counting the wet mobs and proper vigilance.

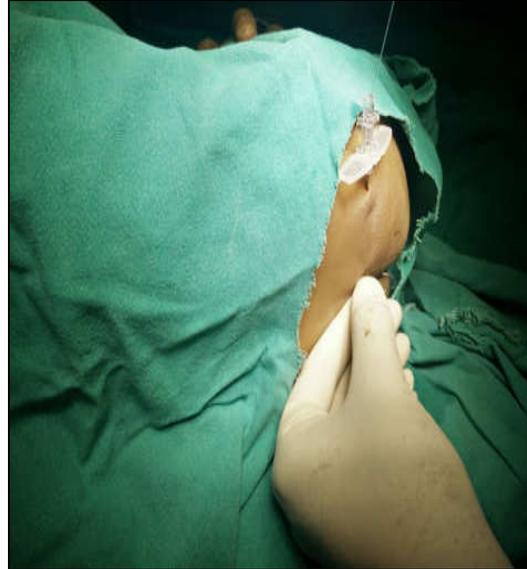
All patients were extubated on table after completion of surgery. Patients were monitored in post operative room with O<sub>2</sub> (4 to 6 litres) for 24 hours with the help of Pulse oximetry. Inj. Bupivacaine 0.4mg/kg/hr with Inj. Dexmedetomidine 0.2microg/kg/hr

infusion<sup>7,8</sup> was prepared with syringe pump of 50ml (Drug was prepared for every 24 hours). It was given continuously for pain management and sedation for 5 days. After 5 days catheters removed and oral analgesics were given.

**Image 3 Tunnelling of Catheter**



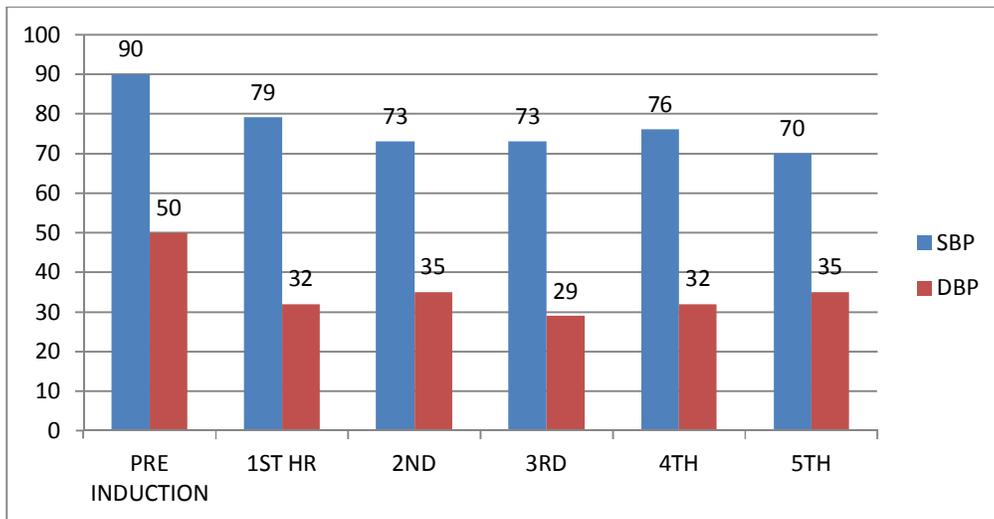
**Image 4 Tunnelling of Catheter**



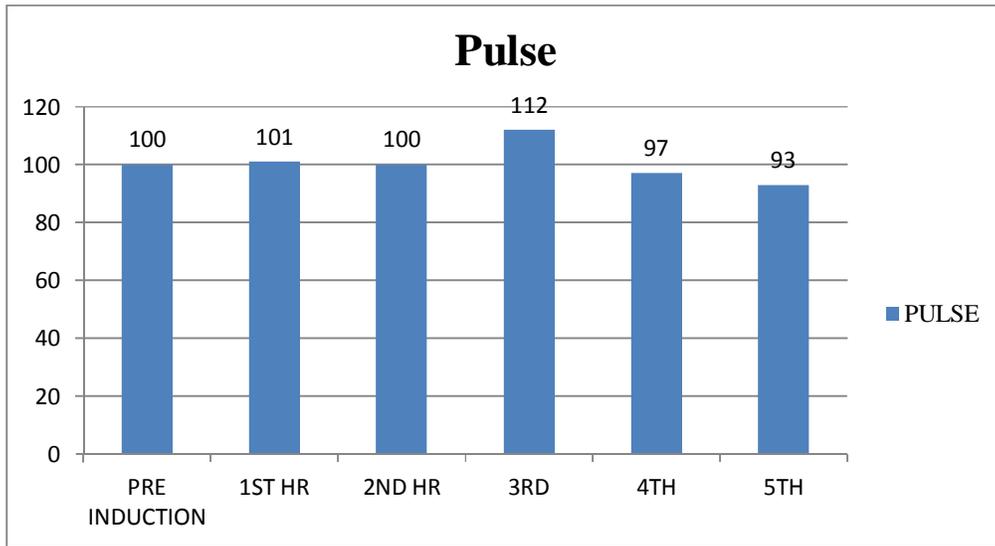
**Results:-**

6 patients needed inhalational induction for application of monitors and insertion of intra-cath. remaining were calm because of higher age group and preoperative counselling. Intra-operative pulse and BP were maintained throughout. Temperature was maintained. No signs of hypothermia noted. Average surgical time was 5 hours.

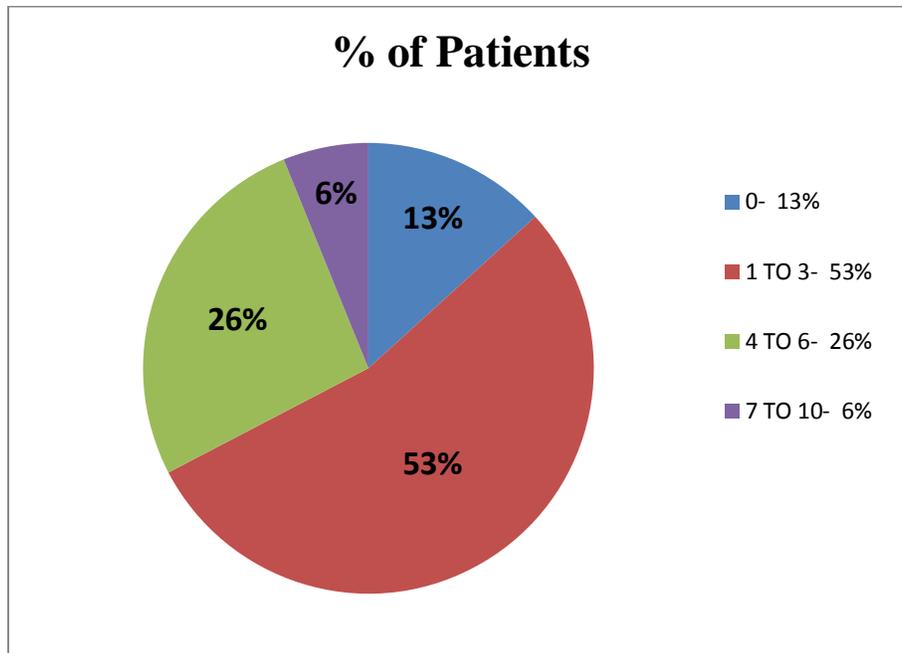
**Chart 1 – Intra-operative Blood Pressure**



**Chart 2- Intra-operative Mean Heart rate**



**Chart 3: Pain Score**



**Pain score:**

- 0 to 1- calm and comfortable (2patient)
- 1 to 3- mild discomfort (8patients)
- 4 to 6- moderate discomfort (4patients)
- 7 to 10- severe discomfort requiring i.v. analgesics (1patients)

After 5 days epidural catheter were removed then changed over to oral analgesics and all patients discharged after 1 month.

**Ramsay Sedation score:**

Score	Definition	No. of patients
1	Anxious, agitated or restless	2
2	Cooperative, oriented and tranquil	8
3	Responds to commands	4
4	Asleep but with brisk response to light	1
5	Asleep sluggish response to light	0
6	No response	0

**Discussion:-**

Primary surgical repair requires hours of surgery with fluid and blood loss that can be considerable in the infant and paediatric patient. It is recommended that adequate venous access and invasive vascular monitoring be utilised. Post operative pain management needs intensive care.

Care of the child with bladder extrophy carries a high risk of morbidity and mean hospital stay of 4-8 weeks. Appropriate immobilisation and post operative care are important factors in the success of the surgery. Epidural analgesia (regional technique) has advantages of giving excellent pain control, typical less post operative nausea and vomiting and minimal physiological alterations. Postoperative apnoea is lessened. Heavy sedation and intravenous drugs for analgesia are avoided which may cause respiratory depression. Patients are pain free and alert with regional technique.

But it has potential for toxicity (if duration is prolonged) from local anaesthetics so recommended plasma levels done after 48 hours. It can cause nerve root damage. Procedure should be done with expert hands.

We preferred giving low doses of bupivacaine and dexmedetomidine to lower its toxicity. Dexmedetomidine has added advantage of sedation which was very useful in such patients. We did not find any signs of toxicity or cardio respiratory instability in postoperative patients.

In instances where epidural placement was contraindicated or unsuccessful intravenous PCA (patient controlled analgesia) is useful for pain control. In our study it was not needed. Subcutaneous tunnelling of catheter was very useful to avoid infection at catheter insertion site and there was not accidental dislodgement.

These goals may be difficult to achieve in this age group so it often requires multimodal therapy like reassurance, distraction, and parental presence. After 5 days patients were given intravenous or oral opioids, benzodiazepines, NSAIDS, paracetamol as per requirement.

**Conclusion:**

Perioperative management with tunnelled epidural catheter and general anaesthesia in small children with bladder exstrophy facilitates excellent intra-operative management. Postoperative immobilization, analgesia, and sedation resulting in an excellent pain relief and

cosmetic repair with no case of bladder prolapse or wound dehiscence. Efficient communication between the anaesthesia team and paediatric surgery dept with trained staff is a pre-requisite for correct analgesic management of these patients.

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