

# CAN STANDARD OPEN PEDIATRIC UROLOGICAL PROCEDURES BE PERFORMED ON AN OUTPATIENT BASIS?

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## ABSTRACT

**Purpose:** We questioned whether it is feasible in the current era of cost consciousness to perform standard open pediatric urological procedures on an outpatient basis while maintaining patient safety and satisfaction.

**Materials and Methods:** We report on 51 consecutive patients 2 months to 13 years old (mean age 4 years 3 months) who underwent a standard open pediatric urological procedure between August 1999 and June 2000. The procedures included ureteral reimplantation in 22 cases (tapered in 2), pyeloplasty in 20, partial nephrectomy in 2, nephrectomy in 2, complete ureterocele reconstruction in 1 and other in 4. The expectation that the procedure would be performed on an outpatient basis was discussed with parents preoperatively. We excluded only cases requiring bowel for reconstruction. A caudal block was administered at the start of the procedure using 0.25% bupivacaine with 1:200,000 epinephrine at a dose of 1 cc/kg. The wound was infiltrated with 1 cc/kg. 0.25% bupivacaine and 0.5 mg./kg. ketorolac was administered at the end of the procedure. As soon as the child awakened, an age appropriate diet was started and 0.5 to 1 mg./kg. codeine with acetaminophen was given every 4 hours.

**Results:** Of the 51 children 44 (86%) were discharged home the day of surgery. Average postoperative hospitalization was 7 hours. One of the 44 children discharged home required a single catheterization elsewhere. There were no other complications or repeat hospitalizations.

**Conclusions:** Our experience shows that standard open pediatric urological procedures may be performed safely and comfortably on an outpatient basis.

**KEY WORDS:** ambulatory surgical procedure, anesthesia, urological surgical procedures, hospitalization

Health care providers are currently challenged to provide the best medical care in an efficient, cost conscious manner. Physicians are striving to decrease hospital costs and hospital stay, while maintaining patient safety and satisfaction. Lower costs for a procedure make the institution offering care more attractive to insurers and shorter hospitalization is a significant factor in the total cost.

Standard open pediatric urological procedures often require a hospital stay of 2 to 4 days. Data imply that even short-term hospitalization may cause psychological upset in children.<sup>1</sup> The majority of our patients who underwent a standard open pediatric urologic procedure, such as pyeloplasty, heminephrectomy, simple nephrectomy or ureteral reimplantation, were discharged home the day after surgery. Thus, we questioned whether it would be feasible to perform these procedures on an outpatient basis, while maintaining patient safety and satisfaction.

Certain aspects of patient treatment are critical when considering same day surgery. The patient and caregivers must be comfortable in the ability to return home the day of surgery and adequate pain control must be achieved with oral medication. We describe our initial experience with standard open pediatric urological procedures performed on an outpatient basis.

## MATERIALS AND METHODS

From August 1999 to June 2000 we performed 51 standard open pediatric urological procedures with the intent of discharging the patient home the day of surgery. The expectation that each procedure would be performed on an outpatient basis was discussed with parents preoperatively. Initially from August 1999 to October 1999 we counseled only

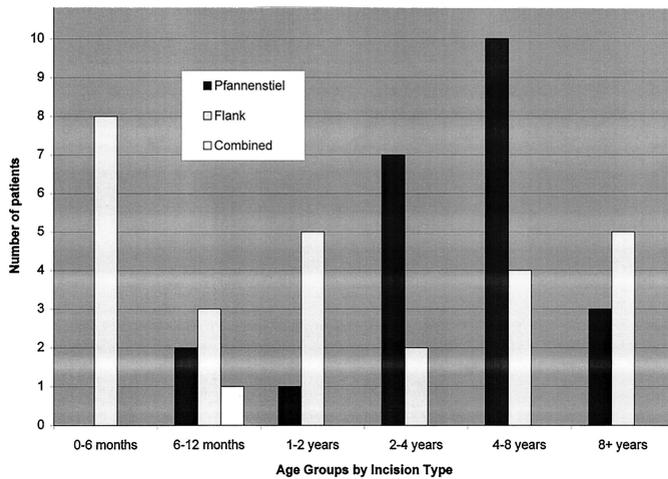
patients with surgery performed via a flank incision that they would be discharged home the same day but after October we expanded our criteria to include all pediatric standard open urological procedures (table 1). Average patient age was 4 years 3 months (range 2 months to 13 years) (see figure). Of the patients 22 were male and 29 were female.

Anesthetic management began with the induction of general anesthesia using the inhalational agent sevoflurane. Preemptive analgesia was provided by a caudal block using 0.25% bupivacaine with 1:200,000 epinephrine at a dose of 1 cc/kg. after general anesthesia was induced. Of the children 45 received a caudal block and 6 did not due to age or spinal dysraphism. A dose of 0.5 mg./kg. ketorolac and ondansetron were injected intravenously at the end of the procedure. The wound was infiltrated before closure with 0.25% 1 cc/kg. bupivacaine. When cystotomy was performed, a portion of a belladonna and opium suppository was administered rectally.

When the child awakened, clear fluids were started and 0.5

TABLE 1. *Spectrum of procedures*

Procedure	No. Pts.
Flank incision:	
Pyeloplasty	20
Heminephrectomy	2
Nephrectomy	2
Ureteroureterostomy	1
Pyelolithotomy	1
Pfannenstiel incision:	
Ureteral reimplantation	22
Ureterectomy	1
Excision of ureterocele	1
Combined incision total ureterocele reconstruction	1
Total No.	51



Patient age distribution by incision type

to 1 mg./kg. codeine with acetaminophen was administered orally every 4 hours. Urethral catheters were removed after urine output was adequate and the patient readily moved the lower extremities. Children were discharged home after they met specific criteria, including adequate oral intake, adequate control of postoperative pain on oral analgesics, as assessed by the physician and nursing staff, and voiding. We defined postoperative hospitalization as the time between the end of surgery and discharge home, and total hospitalization as the time from hospital admission to discharge.

#### RESULTS

Of the 51 patients 44 (86%) who underwent a standard open pediatric urological procedure were discharged home the day of surgery. The likelihood of same day hospital discharge did not differ according to incision type (table 2). Average postoperative hospitalization in the 44 patients who were discharged home the same day was 7 hours and average total hospitalization was 11.4 hours. Six of the 7 patients who did not return home the same day were discharged from the hospital early the next morning. Average postoperative hospitalization of the 7 children who did not return home the same day was 19.4 hours and average total hospitalization was 26.7 hours (table 3). One patient returned home on postoperative day 2 and 5 others returned home the day after surgery due to urinary retention. One patient was discharged home the morning after surgery because surgery finished late in the evening. Average postoperative and total hospitalization in the 51 patients overall was 9.2 and 13.5 hours, respectively.

There was only 1 complication in the 44 patients who returned home the same day. A child in urinary retention required a single catheterization elsewhere. We noted no other complications or repeat hospitalization. We obtained blood for bupivacaine measurement in 5 consecutive patients 1 hour after wound infiltration. The average level was 0.87  $\mu\text{g./ml.}$ , which is below the high normal value of 1.1  $\mu\text{g./ml.}$  provided by the reference laboratory after a single 150 mg. peridural blocking dose.

TABLE 2. Likelihood of same day discharge home

Incision Type	No. Pts.	No. Same Day Discharge Home (%)
Flank	26	22 (85)
Pfannenstiel	24	21 (88)
Combined	1	1 (100)
Totals	51	44 (86)

TABLE 3. Hospitalization

Pt. Group	No. (%)	Av. Hrs. Hospitalized	
		Postop.	Total
Same day discharge home	44 (86)	7.0	11.4
Overnight stay	7 (14)	19.7	26.7
Totals	51	9.2	13.5

#### DISCUSSION

Since implementation of the Diagnosis Related Group payment system by the federal government in the early 1980s and decreasing reimbursement legislated by the Balanced Budget Act of 1985, health care facilities and providers have been expected to deliver the same quality of health care at lower cost. This increasing financial pressure has partially forced shorter hospitalization. However, our impetus to perform outpatient open pediatric urological procedures was not driven primarily by financial concerns but by the observation that our patients really did not require acute hospital treatment after surgery. Most children required minimal nursing care postoperatively and the patient and parents are usually more comfortable in the home setting.

Preparation of the open pediatric urological procedure begins when surgery is planned. We explain to the parents and patients that we usually perform these procedures on an outpatient basis and most children are able to return home the same day. Parents are reassured that the child would not be sent home until our criteria are met and importantly the child would not be discharged home when there is too much discomfort. We believe that hospitalization is not only a function of the surgical procedure and postoperative management, but also of parent and patient expectations. Our experience implies that when parents are counseled to expect same day surgery, the child and parents are prepared for and expect same day discharge home.

Advances in surgery, anesthesia and analgesia have allowed physicians to perform procedures on an outpatient basis that 20 years ago involved an inpatient stay of a week. Our ability to perform open pediatric urological procedures on an outpatient basis clearly depends on patient anesthetic treatment. Preemptive analgesia is provided by a caudal block with bupivacaine, which is administered after the induction of general anesthesia. The block decreases the intraoperative requirement for inhalational agents and, thus, ameliorates subsequent postoperative nausea. Caudal anesthesia with bupivacaine provides effective analgesia and causes minimal interference with urination and motor function.<sup>2</sup> In addition, preemptive caudal bupivacaine given before the surgical incision may decrease the amount of postoperative analgesia required.<sup>3</sup> Kundra et al noted that patients who receive bupivacaine and morphine caudally before surgical incision scored lower on the objective pain scale compared to those who received it postoperatively and required less postoperative analgesia.<sup>2</sup>

The wound is infiltrated at the end of the procedure with 1 cc/kg. 0.25% bupivacaine and 0.5 mg./kg. ketorolac as administered to block further the patient perception of pain. Because patients are comfortable immediately after the procedure and not nauseated, they readily tolerate oral analgesic agents. Postoperatively nausea is less pronounced because of the decreased need for inhalational agents and a preemptive dose of ondansetron at the end of the procedure. Patients are given 0.5 to 1 mg./kg. codeine with acetaminophen orally every 4 hours, which is started before the patient perceives pain. For procedures in which cystotomy is performed a portion of a belladonna and opium suppository is administered at the end of surgery. We believe that our ability to perform these procedures on an outpatient basis is related to the

administration of preemptive analgesia. Blocking the pain pathways early allows children to remain comfortable during the postoperative period and they may be treated with acetaminophen with codeine.

The urethral catheters are removed when the child has adequate urinary output and any obvious motor effects of caudal anesthesia have dissipated. Subjectively we have observed that a Foley catheter seems to aggravate bladder spasms and, therefore, we have chosen early removal. Except for transient urinary retention in 5 patients there were no complications of early catheter removal and children are routinely discharged home without a urethral catheter.

Reports of laparoscopic procedures tend to focus on the cost saving of a minimally invasive technique. Luks et al described a cost saving for laparoscopic compared with open pediatric surgery.<sup>4</sup> The intraoperative cost of laparoscopy was \$442 to \$1,551 greater than that of open procedures. Although intraoperative costs are greater, the laparoscopic technique achieved lower overall cost because of shorter hospitalization. Hamilton et al reported a hospitalization of 22.5 hours for patients undergoing laparoscopic nephrectomy.<sup>5</sup> Our average total hospitalization was 13.5 hours, which included patients who not only underwent extirpative procedures, but also reconstructive procedures. By performing standard open pediatric urological procedures on an outpatient basis we achieve cost savings due to shorter hospitalization and inexpensive intraoperative charges.

Many children respond to hospitalization with short-term changes in behavior, which in most are relatively minor, although in others the experience may result in more prolonged behavior changes that may last months.<sup>1,6</sup> There is

some evidence that even hospital admission of 2 to 4 days may result in behavioral sequelae.<sup>7</sup> We hope that by performing open pediatric urological procedures on an outpatient basis and avoiding an overnight stay we are less likely to cause any psychological repercussions.

#### CONCLUSIONS

Standard open pediatric urological procedures may be performed safely and comfortably on an outpatient basis. Most children do well with minimal complications. The financial advantage of this approach lies in the shorter hospitalization.

#### REFERENCES

1. Vernon, D. T. A.: *The Psychological Responses of Children to Hospitalization and Illness: A Review of the Literature*. Springfield, Illinois: Thomas 1965
2. Kundra, P., Deepalakshmi, K. and Ravishankar, M.: Preemptive caudal bupivacaine and morphine for postoperative analgesia in children. *Anesth Analg*, **87**: 52, 1998
3. Berde, C.: Epidural analgesia in children. *Can J Anaesth*, **41**: 555, 1994
4. Luks, F. I., Logan, J., Breuer, C. K. et al: Cost-effectiveness of laparoscopy in children. *Arch Pediatr Adolesc Med*, **153**: 965, 1999
5. Hamilton, B. D., Gatti, J. M., Cartwright, P. C. et al: Comparison of laparoscopic versus open nephrectomy in the pediatric population. *J Urol*, **163**: 937, 2000
6. Thompson, R. H.: Where we stand: twenty years of research on pediatric hospitalization and health care. *Child Health Care*, **14**: 200, 1986
7. Wright, M. C.: Behavioural effects of hospitalization in children. *J Paediatr Child Health*, **31**: 165, 1995