

## OUTPATIENT PEDIATRIC UROLOGICAL SURGERY: TECHNIQUES FOR A SUCCESSFUL AND COST-EFFECTIVE PRACTICE

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### ABSTRACT

Of 674 operations performed in the pediatric urology division between January and October 1984, 62 per cent were done on an outpatient and 12 per cent on a 1-night stay basis. The outpatient procedures included major proximal hypospadias repairs and intra-abdominal procedures, as well as inguinal, penile, scrotal and endoscopic procedures. No child required subsequent hospitalization. This successful approach was contingent upon proper patient selection, patient and family education, modern anesthetic and monitoring techniques, and careful followup. For elective procedures, such as hypospadias repairs, patients are operated on when they are 6 to 18 months old. Modern anesthetic techniques include isoflurane to maintain a light level of general anesthesia and adjunctive regional blocking procedures. The availability of a physician support service on a 24-hour basis is fundamental to the success of this approach. Benefits include patient, parental and physician satisfaction, diminished potential for nosocomial disease transmission and avoidance of the emotional stress of parent-child separation. Increased use of outpatient surgery is a means to produce a significant decrease in the cost of medical care.

The year 1985 marks an era of ever increasing regulation and cost-containment maneuvers because of the spiraling costs of medical care. Diagnostic related groups have become entrenched firmly within our medical institutions. The most significant component of the increasing cost of medical care continues to be the per diem hospital cost.

Beginning in the early 1970s the Division of Pediatric Urology at our children's hospital initiated a movement towards converting a practice that largely was inpatient to one that currently is predominantly outpatient. Our present analysis reveals that 75 per cent of the pediatric urology surgical cases currently are performed successfully on an outpatient or a 1-night stay basis. This has resulted in substantial economic savings, and medical and psychological benefits, as well as a welcome reception from parents.

### MATERIALS AND METHODS

All operations performed between January and October 1984 were analyzed. Types of operation, inpatient versus outpatient status and actual length of stay were recorded. Urological and anesthetic-related complications on outpatients were determined. Anesthesia department and hospital charges, including per diem, operating room, day surgical and laboratory expenses, were calculated. Information regarding the average charges and length of stay in Pennsylvania hospitals for various pediatric urological procedures was obtained from Blue Cross of Philadelphia. Peer group hospitals include medical schools, and intensive teaching, teaching, private, pediatric and specialty hospitals. A comparison was made regarding total charges and length of stay for identical operations performed at our hospital versus Pennsylvania peer group hospitals.

*Mechanics of day surgery.* At a pre-visit appointment, a complete blood count and urinalysis are obtained unless the history dictates a need for other tests. The parents and child visit the outpatient surgical unit, where the nursing staff takes a history, and explains feeding instructions and preoperative care. Booklets describing the procedure and its after effects are distributed, and the family is given a tour of the facility. A member of the anesthesia department performs a screening

physical examination and evaluation for anesthesia. One day before the procedure the parents receive a phone call from the outpatient nursing staff to ensure that all questions have been answered and to review feeding instructions.

The patient and parents arrive at the outpatient unit 2 hours preoperatively, at which time the urology resident takes a history, performs a physical examination and obtains informed parental consent. The patient less than 1 year old is premedicated with 0.02 mg./kg. atropine sulfate orally. An oral combination, consisting of 1.5 mg./kg. meperidine, 0.15 mg./kg. diazepam and 0.02 mg./kg. atropine, is used for children more than 1 year old. At a holding area the patient and parents meet the anesthesiologist and surgical nurses. The patient is transported to the operating room where anesthesia is induced gently by mask. Halothane is used typically for induction because of its potency and smooth effect. Routine monitoring includes a precordial or esophageal stethoscope, blood pressure determinations with Doppler ultrasound, electrocardiography and temperature monitoring with a rectal probe. Isoflurane often is used for maintenance of anesthesia. Adjunctive regional blocking techniques with bupivacaine hydrochloride have been useful for groin and penile procedures.

During the operation special nurse coordinators act as a liaison between the surgeons and parents, keeping the family abreast of progress and allaying their anxiety. At the termination of the procedure the patient is transported to the recovery room and then, after about 45 minutes, to a designated postoperative area where the child is reunited with the parents. The patient is discharged from the hospital when he is fully awake and tolerating fluids. A urologist is available on a 24-hour basis should a problem or any question arise.

One day postoperatively an anesthesia nurse clinician contacts the parents to inquire about postoperative anesthetic-related problems.

### RESULTS

Of all operations performed during the 10-month interval 62 per cent were on an outpatient, 12 per cent on a 1-night stay and only 25 per cent on an inpatient basis (table 1). The gamut of operations performed successfully on an outpatient basis included endoscopic, groin, scrotal and penile procedures, as

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TABLE 1. Patient distribution from January to October 1984

Procedure	No. Pts. (%)
Outpatient	420 (62.3)
1-night stay	84 (12.5)
Inpatient	170 (25.2)
Total	674 (100.0)

TABLE 2. Outpatient and 1-night surgical procedures from January to October 1984

Procedure	No. Outpts.	No. 1-Night Stays
Hypospadias	130	55
Standard orchiopexy	99	4
Hernia/hydrocele	51	0
Cystoscopy	29	8
Circumcision	25	1
Testes biopsy	16	0
Orchiectomy/prosthesis	13	0
Fowler-Stephens orchiopexy	11	2
Urethrocutaneous fistula	11	0
Internal urethrotomy	6	5
Meatoplasty	5	0
Scrotoplasty	4	3
Miscellaneous	20	6

No patient stayed for more than 1 night.

well as major hypospadias repairs and intra-abdominal orchiopexy (table 2).

Two commonly performed pediatric urology procedures, orchiopexy and hypospadias repairs, were used as representative examples for cost analysis. In the peer group hospitals the average length of stay incurred for an orchiopexy and hypospadias repair is 1.8 and 2.5 days, respectively. The savings resulting from these procedures being done on an outpatient basis at our hospital versus an inpatient basis at the peer group hospitals were \$190 and \$1,268, respectively. These savings achieve significance when the total number of children undergoing these procedures is considered. During the 10-month reference period the savings resulting from performing orchiopexy and hypospadias repair on an outpatient basis were \$19,000 (9.2 per cent) and \$165,000 (33.8 per cent), respectively, (table 3).

Table 4 compares charges for orchiopexy and hypospadias repair done on an outpatient versus an inpatient basis at our institution. Peer group hospital stays are used for the inpatient calculation. Savings of \$952 and \$1,435, respectively, result from the outpatient approach.

Complications could be classified as anesthesia-related and urological (table 5). Nausea with emesis was the most common problem and generally resolved rapidly without the need for antiemetics or hydration. Minor temperature elevations (less than 38.5C) were relatively common, probably were secondary to atelectasis, generally resolved within 24 hours and rarely required antipyretic therapy. Sore throat and cough occurred with similar frequency as low grade fevers, could be attributed to the placement of the endotracheal tube and required only symptomatic treatment. The most common urological problems encountered were stent problems, including bladder spasms and stent blockage, which were treated by stent irrigation, and belladonna and opioid suppositories. Rarely, a small amount of oozing from incisional lines was encountered, which generally required reassurance to the parents. One patient had urinary retention after hypospadias repair and required straight catheterization. One patient with a large scrotal hematoma after a hypospadias repair was treated conservatively with ice packs. No patient required rehospitalization after an outpatient procedure.

#### DISCUSSION

In 1909 Nicoll first reported experience with the ambulatory surgery approach and concluded that it was as satisfactory as

TABLE 3. Savings as a result of outpatient surgery

	Orchiopexy	Hypospadias Repair
No. outpatient procedures (Jan.-Oct. 1984)	99	130
Av. peer group hospital stay (days)	1.8	2.5
Savings in 10-mo. period (\$)	19,000	165,000
% savings	9.2	33.8

TABLE 4. Comparison of hospital charges

	Orchiopexy	Hypospadias
Outpatient charge (\$)	1,873	2,479
Inpatient charge (\$)*	2,825	3,914
Savings (\$)	952	1,435

\* Based on peer group stay.

TABLE 5. Complications

	No. (%)
Anesthesia:	
Nausea/vomiting	— (20)
Minor fever	— (5)
Sore throat/cough	— (5)
Urological:	
Stent problems	8 (2)
Minor hemorrhage	2 (0.5)
Urinary retention	1 (0.25)
Wound hematoma	1 (0.25)

No patient required rehospitalization.

inpatient care while conserving resources.<sup>1,2</sup> After a hiatus of more than half a century, interest in outpatient surgery has been renewed to the extent that it now is one of the most rapidly growing components of the health care system. Of the 22,000,000 operations performed annually in the United States 18 per cent are on an ambulatory basis and ambulatory procedures account for 8 per cent of the total surgical revenue.<sup>3</sup> It is available in 70 per cent of all nonfederal United States hospitals located in major metropolitan areas.<sup>4</sup> In 1980 urological procedures were responsible for 5.4 per cent of all outpatient procedures.

Disadvantages of the outpatient approach are few. Rarely, a patient requires subsequent rehospitalization because of complications. Bruns noted a 14 per cent complication rate among the more than 75,000 outpatient procedures performed in 1980.<sup>4</sup> Omitting nausea and vomiting the complication rate was 5 per cent, most of which could be handled with a telephone call or office visit. A frequently stated disadvantage of outpatient surgery is lack of contact between students and residents, and surgical outpatient cases, which can result in the loss of valuable experience. However, at our hospital the outpatient procedures are a fundamental and integral part of the training program, and residents are exposed to all children undergoing an outpatient operation.

The concept of outpatient surgery as it applies to pediatric urology is not novel. Caldamone and Rabinowitz reported experience with outpatient orchiopexy, which was performed safely in 68 per cent of the patients.<sup>2</sup> Contraindications were family or social circumstances, associated major medical problems, simultaneous procedures and previous inguinal procedures. At our hospital we found that intercurrent medical problems can be handled by appropriate specialty consultation on an outpatient basis. In addition, simultaneous procedures can be performed uneventfully on an outpatient basis and the presence of an inguinal scar, which often makes for a more tedious and lengthy dissection, does not prohibit the outpatient approach.

Shepard and associates demonstrated the feasibility of outpatient pediatric urological surgery for various procedures in terms of safety and cost-effectiveness.<sup>5</sup> We have extended the spectrum to include major proximal hypospadias repairs and intra-abdominal procedures, including transperitoneal explo-

ration for nonpalpable testicles and the Fowler-Stephens orchiopexy.

At our hospital the outpatient approach to evaluation has shortened the hospital stay even for children undergoing a major procedure. Almost all patients with a major problem are admitted to the hospital the same day as the operation. The primary reasons for a patient to be hospitalized 1 day preoperatively are to address serious underlying medical disorders not amenable to outpatient specialty consultation, to complete a 3-day bowel preparation (the first 2 days of which are performed at home) and for convenience to patients referred to our center from distances greater than several hundred miles.

When possible patients undergoing elective procedures are operated on when they are 6 to 18 months old. Before the age of 6 months the risk of sudden infant death syndrome associated with a general anesthetic is increased substantially, and these patients also are most susceptible to anesthesia-related cardiac arrest.<sup>6</sup> On the other hand, gender identity in most children is consolidated by the time they are 2 years old.<sup>7</sup> From the standpoint of sexual identity the earlier that genital surgery is performed the more advantageous it is to the child with respect to minimizing emotional stress and providing a psychological benefit. According to Klykylo the 12 to 36-month-old child experiences a "separation-individuation" period of emotional development in which the child forms a psychologically separate and potentially independent identity.<sup>7</sup> Since the critical period is between the ages of 18 and 24 months it is advisable to avoid an operation in these children. Prugh and associates demonstrated an extremely high incidence of behavior disturbance upon arrival home in children who were hospitalized as inpatients.<sup>8</sup> Avoidance of parental-child separation will minimize fear and emotional trauma.<sup>9</sup>

Children are ideal candidates for outpatient procedures because of their rapid recovery from short anesthetics and general resiliency.<sup>10</sup> State-of-the-art pediatric anesthesia and monitoring techniques maintain the patients at a lighter level, anticipate completion of the procedure and have the patient awake upon leaving the operating room. Dorsal penile and ilioinguinal nerve blocks with bupivacaine hydrochloride have decreased the amount of intraoperative anesthetic, shortened recovery room stays and decreased the analgesic requirement during the first 24 hours postoperatively. Isoflurane is superior to halothane because there is less lipid storage and, consequently, more rapid recovery and less postoperative nausea. Thus, at our hospital there is no specific time limit on the length of anesthesia for an outpatient case.

Fundamental to the success of the outpatient approach is the availability of a urologist on a 24-hour basis to answer telephone calls, and to meet the patient and parents in the urology office should a problem arise. An inpatient bed always is available for the unexpected hospitalization. None of our 420 outpatients required rehospitalization, and all urological complications were minor and easily remedied.

The economic advantages of outpatient surgery are evident. Day surgery units are highly efficient and result in savings to the patient, third-party payers and government. These units are closed at night and weekends, and obviate the need for hotel-type hospital facilities that include meals, laundry, bathing facilities and so forth.<sup>10,11</sup> The units are readily staffed because of the ideal hours, lack of weekend duty and closure during holidays.<sup>10</sup> Since a shorter amount of time is spent in the hospital more patients can be treated, thus, freeing inpatient facilities.<sup>9,11</sup> At many hospitals per diem bed rates now

exceed \$500. Thus, it no longer is feasible or justified to keep children hospitalized unnecessarily. In addition, there is a tendency for patients who are in the hospital longer to be subject to more diagnostic procedures and to incur more expense.<sup>12</sup>

Orchiopexy and hypospadias repairs were used as representative examples of the economic benefits of the outpatient surgical approach. In peer group hospitals the average length of stay for an orchiopexy and a hypospadias repair was 1.8 and 2.5 days, respectively. The outpatient approach to 99 orchiopexies and 130 hypospadias repairs in the 10-month study period resulted in savings of \$19,000 and \$165,000, respectively. Evans and Robinson noted that since outpatient surgery reduces costs to the individual the total number of patients treated must increase to increase the hospital revenue.<sup>12</sup> The savings in terms of convenience to the parents and patients, and psychological benefits cannot be given a monetary value. Outpatient surgery usually precludes the occurrence of nosocomial infections related to cross infection.<sup>1,10,11</sup> Forced early ambulation fosters a return to active preoperative status.

Health care costs are spiraling, with the largest contributing factor being hospital costs. Surgical care accounts for \$50 billion of the annual \$200 billion spent on health care in the United States.<sup>3</sup> Physicians must recognize that resources are limited, and a conscientious and concerted effort to work within the financial constraints generated by our system of medicine must be made. It has been estimated that 35 per cent of all operations and 60 per cent of all pediatric operations can be performed on an outpatient basis.<sup>9</sup> Ambulatory pediatric urological surgery is safe, convenient, readily accepted and, often, requested by parents. It is cost-effective, decreases nosocomial disease transmission, minimizes psychological trauma and conserves hospital beds for those who genuinely need them. The extension of these methods and principles to other surgical disciplines has great potential in our cost-conscious era of medicine.

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