Outpatient Pediatric Surgery in a Developing Country

Parkash Mandhan (Departments of Pediatric Surgery, Liaquat Medical College, Jamshoro, Hyderabad.)
Aftab Shah (Departments of Anesthesia, National Institute of Child Health (NICH), Liaquat National Hospital.)
A.W. Khan,Nizamul Hasan (Pacdiatric Surgery, National Institute of Child Health (NICH), Liaquat National Hospital.)
Muniruddin (Department of Anesthesia, Jinnab Postgraduate Medical Centre. (JPMC), Karachi.)

Abstract

Objective: To access the prospects of daycare pediatric surgery in a developing country like Pakistan in view of economic advantages, parent's acceptability and utilization of hospital resources.
Methods: This prospective study was carried out in Karachi from 1st January 1994 to 31st December 1996 in three different private hospitals having optimum operating, anaesthetic and recovery facilities. Selection criteria included genera! fitness for surgical procedure, not requiring hospitalization, no associated congenital malformation and co-operative parents residing in Karachi. An evening before surgery, all patients were examined thoroughly and detailed instructions for pre-operative fasting and pre-medications were given to the family. Operations were carried out by same surgical team with different set of anesthetists. After surgery and recovery from anesthesia, the children were observed in a holding area adjacent to operating room till fully conscious and alert. Before leaving the hospital, the parents were briefed about post-operative care at home like feeding, ambulation and use of analgesics. A contact telephone number was also provided to the family for any difficulty or emergency. All patients were re-examined[36-48] hours post-operatively in clinic, for any problem at home and the parents were assessed for their attitude toward this modality.
Results: In 3-year period a total of 368 surgical procedures were carried out of whom 129 operations were done in children under 1-year of age and the youngest patient was one week old with a weight of 2.9 kg. The average age was 2.9 years and average weight was 13 kg. Male:female ratio was 3.6:1. The average operating time was 28 min, average anaesthesia time was 38 mi and average recovery time was 17 min, which was not affected by the use of endotracheal tube. Majority of parents managed their children very well at home and only 17% of them called one of the surgeons to inquire about their apprehension at home and all were explained and satisfied. On an average 37% children required two doses of post-operative oral analgesia and 59% returned to normal activity after 24 hours. The overall incidence of complication was 3.6% and there were no deaths or major complications. Only one patient required post surgical hospitalization due to post-operative pneumonia. The mode of management was cost effective and also the parents appreciated the avoidance of hospitalization because of less disruption of their routine work at home and office.
Conclusion: Based on the above experience, we recommended that a variety of common pediatric operations can be done safely as out patients in infants and children, with economic advantages, high parent's acceptability and better utilization of hospital resources without scarifying the quality of health services (JPMA 50:220, 2000).

Introduction

Nicoll first introduced the concept of outpatient surgery in 1909 in Glasgow[1], but it was abdandoned due to high rate of complications. However, since last twenty-five years the practice of day care surgery has gained wide acceptance from both medical profession and families[2]. Its benefits include cost saving, improved utilization of hospital staff and beds[3], early ambulation[4], decreased probability of acquiring an in-hospital cross-infection[5], decreased separation anxiety[7], less emotional stress for the child7 and reduced disruption of family unit[8]. The indication and use of outpatient pediatric surgery have increased everywhere with time, as safe anesthetic and operative techniques have evolved and the infants and children health care demands have exceeded the existing inpatient facilities.

The problems of health care delivery for children in developing countries, like Pakistan are many. Among them is the paucity of funds, beds available for inpatient care and shortage of trained nursing staff. These facilities could be better utilized by practicing the outpatient pediatric surgery for common surgical conditions of infants and children.

The authors would like to present the results of their experience for outpatient pediatric surgery performed during a period of three years.

Material and Methods

A prospective study was conducted from 1 January, 1994 to 31 December. 1996 to look into the feasibility and related problems of various common pediatric surgical procedures performed as outpatient in our social set up. A total of 368 surgical operations were performed in infants and children in three different private hospitals having optimum operating, anesthetic and post anesthetic recovery facilities. Details of personal data, contact telephone number, duration of surgery, type of anesthesia employed, time of post-operative recovery and total time spent in hospital (from reporting to discharge) were noted on a prepared proforma. Note was taken for the presence of any associated malformation and history of major illness in the past. The same surgical team carried out all the operations with different set of anesthetists.

Selection Criteria

Patients requiring prolonged or complicated operations; those with associated cardiac malformations; neonates with weight of less than 2.5 kg and out station patients were excluded. The capability. intelligence and will of the parents for outpatient surgery were assessed before advising such line of treatment. In addition following general selection criteria were set: (1) Patients not requiring any special post-operative supervision beyond monther's loving care; (2) Patients who do not require any special drug pre or post-operatively and (3) Patients requiring no restrains other than those imposed by the child's own initiative.

Pre-operative Preparation

An evening before the scheduled date for surgery, a complete physical check up of the patient was performed. A complete blood count (CBC) was done in all cases to exclude anemia for the purpose of anesthesia fitness. The parents were then instructed for pre-operative fasting and pre-niedication procedure. Syrup Trichlory1 (Tricolofos, Glaxo Laboratories Pakistan Ltd.) 50 mg/kg was given as premedication about an hour before the surgery and parents were asked to bring the child directly to the waiting area of operating room. On reporting in hospital the identity of the patient was established and preanesthetic fasting reconfirm ed.

Anesthesia

General anesthesia was administered to all the patients by pediatric anesthetist. The induction was carried out either by intravenous thiopentone sodium or with halothane delivered via a facemask depending upon the effect of pre-medication. Maintenance therapy consisted of halothane, nitrous oxide and oxygen administered through a facemask. Endotracheal intubation was performed only for specific indication. e.g.. long procedures, operations of head and neck and when there was difficulty in maintaining an adequate airway. In order to reduce the requirement for general anesthetic agents and to alleviate post-operative pain we used supplemental local anesthesia, either as regional block or local infiltration. Abocain (Bupivacaine hydrochloride 0.5%, Abbott Laboratories Pakistan Ltd.) in a dose 2 mg/kg and 2% Plain Xylocaine (Lignocaine HCL 2%, Wellcome Pakistan Ltd.) in a dose of 4 mg/kg were given as local anesthetic agents. Sometimes a mixture of Abocain and Xylocaine with ratio of 3:1 (in same dose) was used to have a rapid onset and longer effect.

Operations Performed

The procedures done are listed in Table I. Small infants were given priority on the schedule. All operations were performed by the senior surgeon and standard surgical techniques were used in all the patients. Skin closure was accomplished either with non-absorbable sutures or with strips of transparent Opsite adhesive material (Opsite, Smith and Nephew Medical Ltd., Hull, England) and wounds were covered with small dressings. Groin wounds were sealed with Opsite to save from urine soiling.

Post-operative Care and Follow Up

Following operation, all patients were kept in the recovery room under observation of the nurse on ditty who monitored the vital signs. Once they were awake and stable, after check up by anesthetist, they were shifted to the care of their parents in a waiting area adjacent to the operating room. They were given feed if necessary and oral analgesic. Syrup Novalgin (Metamizole Sodium, Hoechst Pakistan Ltd.) in a dose of 20-30 mg/kg to reduce the post-operative discomfort. Before leaving the hospital. parents were further instructed for post-operative care at home, like feeding, ambulation and use of analgesics. An office visit was scheduled after 36-48 hours. A telephone number of one of the surgeons was also provided to contact in case of any difficulty or emergency.

During the first post-operative visit in clinic, the child was examined fully and the parents were interviewed regarding their post-operative management at home, any complication and their overall attitude towards the experience of outpatient surgery. Sutures or Opsite adhesive strips were usually removed from 5th to 7th post-operative day in the clinic on the second visit.

Results

In a period of three years a total of 368 outpatient surgical procedures were performed representing 39% of the total surgical operations. The percentage increased from 23% in first year to 58.5% in last year. There were 91 procedures performed in first year, 11 7 in second year and 160 in the last year. This increase in number occurred due to better understanding of the procedure and acceptance by the parents. Males dominated over the females with a ratio of 3.6:1. There were 35% patients under 1 year and 65% over one year of age. The youngest was 8 days with a weight of 2.9 kg and the oldest 12 years with 29 kg weight. an average age of 2.9 years and weight of 13 kg. The variety of surgical procedures done is listed in Table 1.

Table 1. Types of operations.

Operation	No.	%
Inguinal herniotomy	129	35
Ligation of PPV and drainage of hydrocele	68	18.5
Orchidopexy and Orchidectomy	46	12.5
Sigmoidoscopy	26	7.0
Circumcision	24	6.5
Umbilical hernia	17	4.7
Lymph Node Biopsy	11	3.0
Haemangiomas, superficial	9	2.3
Rectal Biopsy	8	2.0
Drainage of abscess	4	1.0
Repair of Meningocele, small	3	0.9
Cystoscopy	3	0.9
Excision of Branchial Sinus	3	0.9
Excision of Thyroglossal Cyst	2	0.5
Excision of Preauricular Sinuses	1	0.4
Miscellaneous	14	3.9
Total	368	100

The average operating time was 28 minutes (range 15-38 min) and anesthesia time was 38 (range 25-56 min) minutes. The average recovery time 17 minutes and it was not affected by the use of endotracheal tube, however infants required less recovery time on an average. The index of recovery was the return of rational response to verbal command in older children and cry in neonates.

Table 2. Post-operative management.

Post-operative behavior	No.	%	Remarks
Pain (for 48 hours post-operative)	136	37.0	Oral analgesics, Syrup Novalgin given
Vomiting (average 2 episodes @ home)	50	13.5	No treatment required
Fever (recorded in first 24-36 hours post-operative)	34	9.2	Oral antipyretic, Syrup Novalgin given
Feeding disturbances in first 24 hours	32	8.7	No treatment required
Drowsiness and General Anxiety	22	6.0	No treatment required
Sore throat	11	3.0	No treatment required
Same day Ambulation	217	59.0	

Table 2 lists the post-operative management of the patients at their home. All these were managed by their parents satisfactorily with regard to feeding, pain and routine activities. Only 17% parents called one of the surgeons on telephone to inquire about their apprehensions at home and all were explained and satisfied. On an There was an average saving of Rs. 2000 per case and a total saving of Rs. 736,000 (US$ 17,952) for total patients.

Average, post-operatively, 37% required two doses of oral analgesia and were not in a need of any special care and 59% returned to their normal activity on the next day. Post-surgical complications incidence was 3.6% (Table 3)

Table 3. Post-operative complications.

Complication	In <1 year		In >1 year	
	No.	%	No.	%
Wound Infection	1	0.2	6	1.7
Hematoma	1	0.2	2	0.6
Bleeding	1	0.2	1	0.2
Hosptial Admission	1	0.2	0	0
Total	4	1.0	9	2.5

and one patient was admitted in the hospital for few days due to post-operative pneumonia. There were no deaths in the whole group.

The acceptance of the outpatient procedure for their children by parents was encouraging as the daily family routine was minimally disrupted. Ninety-three percent thought it satisfactory and appreciated this approach of surgical management. Seven percent parents made few adverse comments which included difficulty in transportation, post-operative vomiting and apprehension regarding the management at home of small kids, which they thought to be better managed as inpatient.

Table 4. A brief cost comparison.

Charges for:	Inpatient	Outpatient	Difference
Operation theater	Rs. 2000	Rs. 1600	Rs. 400
Room (1 day)	Rs. 500	Nil	Rs. 500
Medicines	Rs. 500	Rs. 100	Rs. 400
Travelling, Food, etc.	Rs. 1000	Rs. 300	Rs. 700
Total	Rs. 4000	Rs. 2000	Rs. 2000

Table 4 presents the cost differences between inpatient and outpatient surgery that includes total cost of operating room, room charges for hospitalization, medications, laboratory and food etc., excluding professional fees (surgery and anesthesia). There was an average saving of rupees three thousands per case, thus a total saving of approxmiately rupees eleven hundred thousands for the total patients.

Discussion

One of the earliest experience of outpatient pediatric surgery was reported by Nicoll about ninety years ago, when he and others performed almost 9000 outpatient surgical procedures which included herniae, cleft lips and palates, talipes, spinae bifidae and tuberculous glands. However this practice was abandoned because of high mortality. This was popularized after the report of Herzfeld in 1938 when he reported to sending the infants and children some two hours after surgery[9]. As further experience accrued, the advantages of outpatient surgery became evident and this was widely accepted by medical profession, hospital administrators and the parents. Presently, outpatient pediatric surgery is a rapidly advancing field swiftly coming of age. Advances in anesthesia and its expert administration are the major reasons for the safety and success of outpatient surgery in young children, especially in neonates. Cohen and Dillon[10] have stated that no prospective candidate is denied outpatient surgery because of anesthetic requirements and Jones and Smith[11] have reported age is no limit. Recently, Melone et al[12] has reported a safe inguinal herniorraphy in premature infants (<36 weeks gestational age). In our study, initially al[12] neonates and few infants were admitted for their surgery, but presently only premature or low birth weight babies (<2500 gm) are hospitalized. This age limit is because of increased risk of post-anesthesia apnea. bradycardia and other metabolic disturbances of the premature[13,14]. However, in this series, we succeeded to perform 129 (35%) procedures in neonates and infants with 1% morbidity and no mortality (Table 3).
We have not found any increase in post-operative complications. In our patients. superficial wound infection was seen in 7 cases, hematoma occurred in 3 cases and two patients bled moderately from the skin edges under Opsite dressing. however no further intervention was

required for any case. The wound infection rate of 1 .9% for our series is vary comparable with other similar studies[15] and also the overall post surgical complication rate of 3.4% does not exceed if compared with the studies for hospitalized patients[16,17].

Outpatient surgery also facilitates the avoidance of the problems and inconveniences connected with hospitalization. It was relatively simple for parents to travel to hospital an hour before surgery and take the child home within an hour or so after the operation is completed. In our stud the average hospital stay for a patient was 100 minutes, which is comparable to other well-equipped centers in developed countries[3,18,19]. Hospital admission rate after out patient surgery in our series is 0.2% (Table 3) as compared to the other centers, which has reported 1.5-3%[15,20,21] This is due to our careful selection of cases and detailed briefing of parents before surgery. We also observed minimal disruption of daily routine of families due to short hospital stay. The male members resumed their office same day or next day and females were able to cope with their daily routine.

A brief cost comparison is pertinent because of tremendous potential impact of the outpatient surgery on the delivery of health care[13,22]. In our series there was an average saving of Rs. 2,000.00 (S 49.00) per case and a total saving of approximately Rs. 736,000.00 ($ 17.952.00) for tile group. This is a significant amount for a lower and middle class family of a developing country. Since, the shortage of manpower has been always a major problem of our health care system. outpatient surgery reduces tile demand on hospital staff', therefore their professional services can be better utilized in more effective way ill wards. Hence the number of hospital beds and the professional services so saved can be available to those who require critical inpatient care and more intense nursing.

At a time when the administrative and economic structure of health service in the developing countries, like Pakistan is uider scrutiny, the role of outpatient surgery in tIle delivery of health care for all ages and particularly for children is to be evaluated. There is a shortage of hospital beds for children and also paucity of trained pediatric surgeons and nurses. Under these circumstances, we conclude that outpatient pediatric surgery will prove a desirable means of health care delivery for common surgical lesions in infants and children. It is safe, cost-effective, acceptable and facilities better utilization of hospital staff and resources.

References

1.Nicoll JH. The surgery of infancy. Br. Med J., 1909;1 8:753-54

2.Shah CP, Robinson CG. Kinnis, et al. Day care surgery far children. A controlled study of medical complicat ions and parent a attitudes. Med. Care. 972;10:437-50.

3.Cloud DT Reed W. Ford JL, ct al, The surgicenter. A flesh concept in outpatient surgery. i. Pediatr. Surg,. 1972;7:206-12.

4.Ruckley CV. Day care and short stay surgery for hernia. Br. J, Surg.,1978;65:1-4.

5.Steward DJ. Outpatient pediatric anesthesia. Aesthesiol., 1975:43:268—76.

6.Glen PM, El-shafie M. Klippel C Outpatient pediatric surgery. TIte concumer's view Ohio. State Med J., 1980;76:73 1-33.

7.Atwell JD, Burn JMB, Dewar AK, ct al. Pediatric day-case surgery Lancet. 1973;2:85-97.

8.Lawrie R, Operating on children as day-cases Lancet. 1964;2 1289-91.

9.Ierzfeld G. Hernia is infancy, Am. J. Surg.. 1938.39:422-28.

10.Cohen DD, Dillon JK. Anesthesia for outpatient surgery. Springfield, IL. Thomas, 970.

11.Jones SEF. Smith I3AC. Anesthesia for pediatric day surgery J. Pediatr. Snip, 1980;15:31-33.

12.Melone JH, Schwartz MZ. Tyson KRT, et al Outpatient inguinal Herniorraphv in Premature Infants: Is it Safe'.t J. Pediatr Surg.. 1992,27 203—208.
13.Mayhew JF, bourke DL, Guince WS Evaluation of' the premature infants at risk for post—operatry e complications. Can. J, Anaesth., 1987;34:627—3.
14.Steward 1).I Preterin infants are in or epronc to comp icatoins following nit nor surgery v than term in fants. Anesthesiol., 1982:56:304—306.
15.EI—Shafie NI. Shapnii RP Outpatient pediatric surgery itt a developing country Pediatrics. 1977:60:600-602.
16.Harvcv Mi—I, Johnston MS. Fossard DP lngnuinal hernoitomy in children a flve-year Hi. J Surg. I985;72:485-87.
17.Atwel I JO, Pediatric davcare surgery in Southampton Nursing Times, 1975;71:841-43.
18.Sliandlinu B. Steward DJ Regional Analgesia for post—operative pain in pediatric outpatient surgery.J Pediatr. Surg, 1980;15:477—80.
19.Lunger JC, Shand dig It, Riisernberg M, Itiitra—operative bupivacainc during oittpaticiit hernia repair in children A randomized doubel blind trial. 3. Pediatr. Surg., 987:22267-70.
20.Postnitta R, Ferguson CC. Stanwick RC, et al pediatric day—care snrgery: 30— year hospital experience. J. Pediatr. Surg., 987;22:304-117.
21.Moir CR, Fraser BGC. Marshall RI I. The emerging pattern of Pediatric day— care surgety J. Pediatr. Surg., 1987;22:743-45.
22.Mejdahl S. Gyrtrup HJ, Kvist E. Outpatient operation of inguinal hernia in children, Hr. 3. Surg., l989;76:406-407.