

OPEN SURGERY REPAIR IN INGUINAL HERNIA IN CHILDREN. A CLINICAL-EVOLUTIVE ASSESSMENT OF 64 CASES

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Keywords: open surgery repair, inguinal hernia in children, complications, costs

Abstract: Background. Open surgery (OS) repair represents the standard treatment in inguinal hernia (IH) in children. Objectives. Clinical-evolutive assessment of IH repairs by OS between 2011-2013. Method. The evaluation criteria: age, origin area, length of stay (LoS), average cost of hospitalization (per day-ACHD, per patient-ACHP), complications. Results. 64 cases were evaluated: 45 (70,31%) younger than 7 years old, 33 (51,56%) originated from rural environment, 44 right side IH (4 strangulated, 5 scrotal-inguinal, 1 descend into labia), 20 left side IH (2 scrotal-inguinal, 2 descends into labia), 40 (62,5%) with LoS shorter than 5 days. The average LoS was 4,171 days. 2 cases required hematoma evacuation. There were recorded 8 postsurgical complications (5 hematomas, 3 scrotal edemas). ACHD was 326,70 RON, ACHP 1324,63 RON. There was found a high frequency of IH at <7 years age, urban environment (p 0,08) and significant more frequent complications at <7 years of age (p 0,05); without significant correlation between age, LoS, ACHP and complications. Conclusions. The OS repair in IH in children still remains a frequently used procedure, which implies fewer complications, and not expensive costs.

Cuvinte cheie: herniotomie deschisă, hernie inghinală la copii, complicații, costuri

Rezumat: Introducere. Herniotomia deschisă (HD) este tratamentul standard al herniei inghinale (HI) la copil. Obiective. Evaluarea HI operate prin HD în perioada 2011-2013. Metoda. Criterii de evaluare: vârsta, mediul de proveniență, durata de spitalizare (DS), costul mediu de spitalizare (per zi-CMSZ, per pacient-CMSP), complicațiile. Rezultate. Am evaluat 64 cazuri: 45 cu vârstă <7 ani, 33 din mediul rural, 44 HI dreaptă (4 strangulate, 5 inghino-scrotale, 1 inghino-labial), 20 HI stângă (2 inghino-scrotale, 2 inghino-labiale), 40 cu DS <5 zile. DS medie a fost 4,171 zile. 2 cazuri au necesitat evacuarea hematom. Am consemnat 8 complicații (5 hematoame, 3 edeme scrotale). CMSZ a fost 326,70 RON, CMSP 1324,63 RON. S-a constatat frecvența crescută a HI la vârsta <7 ani, mediul urban (p0,08) și semnificativ crescută a complicațiilor la aceeași vârstă (p 0,05). Fără corelații semnificative între vârstă, DS, CMSP și prezența complicațiilor. Concluzii. HD rămâne o procedură frecvent utilizată, necostisitoare, cu puține complicații.

INTRODUCTION

Open surgery repair of inguinal hernia, also called open herniotomy in medical literature, is still one of the most commonly used surgical procedures in infancy and childhood. Open herniotomy is the standard treatment of inguinal hernia in the whole world, and implicitly in Romania too, where it is still preferred to laparoscopic surgery.(1)

PURPOSE

The main objective of the study is to assess the open herniotomy casework features according to:

- diagnosis, length of stay, surgery protocol records,
- pre-, intra- and postsurgical complications (2-4), the average cost of hospitalization day, the average cost of hospitalization per patient.

METHODS

The study is a longitudinal retrospective one comprising all the admitted 64 cases of unilateral inguinal hernia, hospitalized between 2011-2013 in the Pediatric Surgery and Orthopedics Clinic of Pediatric Clinic Hospital Sibiu, all repaired by open herniotomy.

There were examined all the medical records of those patients for whom the following parameters have been studied:

- admission date, age, gender, origin area;
- previous surgical intervention for the same condition, or for other conditions;
- other diseases;
- length of stay, diagnosis upon admission, diagnosis at discharge,
- surgery protocol records;
- pre-, intra- and postsurgical complications.

Selection of cases

The inclusion criteria were the following: patient younger than 18 years old, diagnosis of unilateral inguinal hernia, open herniotomy record on surgical protocol, the consent of parents for including the child in the study.

The exclusion criteria: patient elder than 18 years old, diagnosis of bilateral inguinal hernia, surgical intervention other than open herniotomy (e.g. laparoscopic surgery).

The data collected have benefited by statistical processing:

- the results rated as having a continuous normal distribution

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Article received on 04.04.2014 and accepted for publication on 19.05.2014
ACTA MEDICA TRANSILVANICA September 2014;2(3):272-274

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- have been expressed by mean values + DS,
- the other results, by medians with interquartile range.

RESULTS

Within the above-mentioned period, 64 inguinal hernia cases were operated by open herniotomy and admitted in the study, respectively 29 cases in 2013, 23 cases in 2012 and 12 cases in 2011. The structure of the casework was the following:

a. *By age:*

Table no. 1. Cases repartition according to age group

Age group	0 - 6 months	6 - 12 months	1 - 3 months	3 - 7 months	7 - 14 months	> 14 months
No. of cases	1	8	17	19	15	4

b. *By gender:* males, 48 cases; females, 16 cases.

c. *By origin environment:* 33 cases originating from rural environment and 31 cases from urban environment.

d. *By previous surgical intervention number,* 4 cases have been previously operated for the same condition (for contralateral inguinal hernia, not for its relapse); other 4 cases have been operated for other conditions than inguinal hernia, lysis balano-preputial adhesions, respectively.

e. *By length of stay:*

Table no. 2. Cases repartition according to number of hospitalization days

No. of days	1	2	3	4	5	6	7	8	9	10
No. of cases	1	10	15	14	11	5	6	1	0	1

- the average length of stay was 4,171 days,
- the median average length of stay was 4 days.

The most cases, 40 (62,5%) have required less than 5 days of hospitalization; 22 cases (34,375%) have required between 5-7 days of hospitalization and 2 cases (3,125%) more than 7 days of hospitalization. These last 2 cases that required the longest length of stay (8, and 10, respectively) were younger than 3 years old and have presented complications (hematoma).

f. *By diagnosis at admission:*

- Unilateral inguinal hernia, without gangrene, 64 cases,
- Right inguinal hernia, 38 cases, of which
 - Right inguinal hernia, with obstruction, without gangrene (strangulated hernia), 2 cases
 - Right inguinal hernia, without obstruction, without gangrene, 36 cases
- Right scrotal-inguinal hernia, 5 cases
- Descend into right labia, 1 case,
- Left inguinal hernia, 16 cases, of which
 - Left scrotal-inguinal hernia, 2 cases,
 - Descends into left labia, 2 cases.

g. *By surgery protocol record*

The surgery protocols record classical open surgery (open herniotomy) in all cases, a number of cases also requiring: Barter artifice (6 cases), hematoma evacuation (2 cases), lysis of balano-preputial adhesions (4 cases).

h. *By complications:*

- presurgery, 5 cases, of which 3 strangulated hernia,
- postsurgery, 8 cases, from which: hematoma, 5 cases (1 case due to slip of the ligated hernial sac, requiring reintervention and 2 cases requiring surgical evacuation), scrotal edema, 3 cases.

There were recorded 3 complications in females and 10, in males.

i. *By average cost of hospitalization per patient* (1324,63 RON). 30 cases (46,87%) have the hospitalization costs smaller than average cost.

j. *By average cost of day of hospitalization* (326,70 RON). 23 cases (35,93%) with hospitalization cost smaller than average cost.

k. *By medium cost of average length of stay* (1362,67 RON). If 14 cases were within the average length of stay, only 7 have costs close to medium cost of average length of stay.

DISCUSSIONS

A large number of surgical resolved cases older than 1 year but younger than 14 years stand out; the highest number belonging to the age group of 3-7 years old (19 cases, 29,68%).

Regarding the age at admission, it is undoubtedly justified to mention the interrelation with the origin environment, length of stay, average cost of hospitalization, complications.

Thereby:

- the inguinal hernia surgical interventions in children younger than 7 years old originated from urban environment are more frequent (p 0,08) than those in children older than 7 years, regardless of the origin area;
- the length of stay is not affected by age (p 0,23); in other words, the young or great does not involves a longer length of stay; likewise, the length of stay is unaffected by the season when the patient was hospitalized (winter or summer season) (p 0,51);
- the side of inguinal hernia (left/right) is unaffected too by age (p 0,74);
- neither the hospitalization day cost is unaffected by age.

The average cost of hospitalization per patient is not significantly influenced by the age, and complications. However, it is obviously almost entirely influenced by the length of stay, but it has not been possible to establish the amplitude of the statistical significance because no case of those who required a length of stay largest than 5 years did not have the hospitalization cost smaller than average cost.

The hospitalization day cost is affected:

- significantly negatively by the presence of complications (p 0,02),
- positively, but without significance, by the length of stay (p 0,09).

In terms of complications:

- the length of stay is unaffected by the presence of complications (p 0,47); in other words, the magnitude of complications was not so important as to significantly prolongs the length of stay;
- the frequency of complications is not significantly correlated with the side of inguinal hernia (p 0,92), or the complications not appear to be significantly more frequent according to the side of inguinal hernia (left/right);
- the type of complication is not significantly correlated too with the side of hernia (p 0,96); as a result, hematoma or scrotal edema not seem to be more frequent in left inguinal hernia than right inguinal hernia;
- the frequency of complications is not affected by gender (p 0,85).

CONCLUSIONS

- Out of 64 cases, most of them belong to male gender (48 cases) and the rural environment (33 cases).
- The average length of stay was 4,171 days, 40 cases (62,5%) requiring less than 5 days of hospitalization, 22 cases (34,375%) between 5-7 days of hospitalization and 2 cases (3,125%) more than 7 days.
- At discharge, there were reported 38 cases of right inguinal hernia (2 strangulated hernia, 5 scrotal-inguinal hernia and one case descends into labia) and 20 cases of left inguinal

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hernia (2 scrotal-inguinal hernia and 2 cases descends into labia).

4. There were reported 3 presurgical complications (strangulated hernia) and 8 postsurgical complications (5 hematomas, of which 2 requiring surgical evacuation and one case requiring reintervention and 3 scrotal edemas).
5. Simultaneous with open herniotomy, lysis of balano-preputial adhesions was also performed (in 4 cases) and Barter artifice (at 6 cases).
6. The average cost of hospitalization per patient was 1324,63 RON and the average cost of day of hospitalization 326,70 RON.
7. The most of the open herniotomy were required in children younger than 7 years old originated from urban environment.
8. The side of hernia, the length of stay and the cost of hospitalization day are not affected by age.
9. The cost of hospitalization day is significantly negatively influenced by the presence of complications and positive influenced, without high significance, by the length of stay.
10. The length of stay is not influenced by the presence of complications.
11. The frequency of complications is not significantly correlated with the side of hernia.
12. Likewise, the type of complication is not significantly correlated with the side of inguinal hernia.

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