

Evaluation of Patients with Umbilical Hernia: 6 Years Experiences

Umblikal Hernili Hastaların Değerlendirilmesi: 6 Yıllık Deneyim

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ABSTRACT

Objective: Umbilical hernia is a common anterior abdominal wall defect in childhood. Although the defect is present at birth, unlike other hernias of childhood, it may close spontaneously over time without the need for surgery. However, when these hernias do not close spontaneously, complications can develop that require emergency surgery. The aim of this study was to determine the incidence of spontaneous closure in patients diagnosed with umbilical hernia and the factors that influence this incidence, the complications that may develop during follow-up, the indications for surgery and the issues to consider when planning the follow-up of patients.

Material and Methods: Between January 2006 and December 2011, 1928 patients diagnosed with umbilical hernia and followed up and treated in our clinic were included in the study. In this retrospective cohort study the current size of umbilical hernia, comorbidities and demographic characteristics of the patients were analysed. Operative data, complications and postoperative follow-up of the operated patients were evaluated.

Results: The spontaneous closure rate of umbilical hernia was found to be 60%. The rate of spontaneous closure of umbilical hernia was higher in boys and the rate of operation was higher in girls. The risk of incarceration was higher in girls than in boys. The rate of spontaneous closure decreased with increasing defect size. It was found that comorbidities did not affect spontaneous closure of umbilical hernias. The rate of emergency surgery for incarceration was low (2%). Strangulation was noted in 1% of patients. All patients with incarceration were in Lassaletta group 2 (defect diameter 0.5-1.5 cm).

Conclusion: Conservative management is still the most accepted and safest method in the treatment of umbilical hernia. Incarceration and strangulation are very rare in umbilical hernias. Even if the umbilical hernia is complicated, surgical treatment is possible and peri- and post-operative complication rates are very low. Long-term morbidity and mortality due to incarceration have not been reported in the literature.

Key Words: Child, Complication, Spontaneous closure, Umbilical hernia

ÖZ

Amaç: Umblikal herni çocukluk çağında sıkça görülen karın ön duvarı defektidir. Defekt doğumda mevcut olmasına rağmen çocukluk çağının diğer hernilerinden farklı olarak ameliyat gerekmeden zamanla kendiliğinden kapanabilir. Ancak bu herniler spontan kapanmazsa acil ameliyat gerektiren komplikasyonlar gelişebilir. Bu çalışmada umblikal herni tanısı alan hastalarda spontan kapanma insidansının ve buna etki eden faktörlerin, takipte gelişebilecek komplikasyonların ve ameliyat endikasyonlarının belirlenmesi, hastaların takiplerini planlarken dikkat edilmesi gereken hususların ortaya konması amaçlanmıştır.



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Conflict of Interest / Çıkar Çatışması: On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethics Committee Approval / Etik Kurul Onayı: This study was conducted in accordance with the Helsinki Declaration Principles. This study was approved by the academic board of Dr. Sami Ulus Gynecology and Obstetrics Training and Research Hospital and was registered as 22/7 on 19/03/2009.

Contribution of the Authors / Yazarların katkısı: ERTEN EE: Constructing the hypothesis or idea of research and/or article, Planning methodology to reach the conclusions, Organizing, supervising the course of progress and taking the responsibility of the research/study, Taking responsibility in patient follow-up, collection of relevant biological materials, data management and reporting, execution of the experiments, Taking responsibility in logical interpretation and conclusion of the results, Taking responsibility in necessary literature review for the study, Taking responsibility in the writing of the whole or important parts of the study. ERDOĞAN D: Constructing the hypothesis or idea of research and/or article, Planning methodology to reach the conclusions, Organizing, supervising the course of progress and taking the responsibility of the research/study, Taking responsibility in patient follow-up, collection of relevant biological materials, data management and reporting, execution of the experiments, Taking responsibility in logical interpretation and conclusion of the results, Reviewing the article before submission scientifically besides spelling and grammar.

How to cite / Atıf yazım şekli : Erten EE and Erdoğan D. Evaluation of Patients with Umbilical Hernia: 6 Years Experiences. Turkish J Pediatr Dis 2024;18:159-165.

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Received / Geliş tarihi : 13.09.2023

Accepted / Kabul tarihi : 04.01.2024

Online published : 12.02.2024

Elektronik yayın tarihi

DOI: 10.12956/tchd.1359548

Gereç ve Yöntemler: Kliniğimizde Ocak 2006-Aralık 2011 tarihleri arasında umbilikal herni tanısı alan, takip ve tedavisi yapılan 1928 hasta çalışmaya dahil edildi. Retrospektif kohort olarak planlanan bu çalışmada hastaların mevcut umbilikal herni boyutları, ek hastalıkları, demografik özellikleri incelendi. Ameliyat olan hastaların ameliyat verileri, komplikasyonları ve postoperatif takipleri değerlendirildi.

Bulgular: Hastaların umbilikal hernilerinin spontan kapanma oranı %60 olarak bulundu. Erkeklerde umbilikal herninin spontan kapanma oranları daha yüksek olduğu, kızlarda ise ameliyat olma oranının daha yüksek olduğu görüldü. Kızlarda inkarasyon riski erkeklere göre yüksek bulundu. Defekt boyutu arttıkça spontan kapanma oranı azalmakta olduğu görüldü. Hastalarda izlenen ek hastalıkların umbilikal herninin spontan kapanmasına etkisi olmadığı saptandı. İnkarasyon nedeniyle acil operasyon oranının (%2) düşük olduğu gözlemlendi. Hastaların %1'inde strangülasyon saptandı. İnkarasyon izlenen hastaların tamamı Lassaletta grup 2'de yer almaktaydı (defekt çapı 0.5-1.5 cm).

Sonuç: Umbilikal herninin tedavisinde konserve izlem hala en kabul gören ve en güvenli yöntemdir. Umbilikal hernilerde inkarasyon ve strangülasyon oldukça nadir görülmektedir. Umbilikal herni komplike hale gelmiş olsa dahi cerrahi tedavisi mümkündür ve peroperatif-postoperatif komplikasyon oranları oldukça düşüktür. İnkarasyon nedeniyle uzun dönem morbidite ve mortalite literatürde saptanmamıştır.

Anahtar Sözcükler: Çocuk, Komplikasyon, Spontan kapanma, Umbilikal herni

INTRODUCTION

Umbilical hernia is a common anterior abdominal wall defect in childhood. Although the defect is present at birth, unlike other childhood hernias, it may close spontaneously over time without the need for surgery (1). However, complications requiring emergency surgery may develop in umbilical hernias that do not close spontaneously.

Umbilical and epigastric hernias constitute approximately 10% of all hernias (2). The estimated incidence of umbilical hernias is 15-32%, but the actual incidence is not known precisely as it mostly closes spontaneously after a while. It is accepted that approximately 10% of all umbilical hernias remain unclosed until adulthood (3).

Although umbilical hernias are usually seen in a silent clinic, they can also become quite complicated and may present with life-threatening conditions. Incarceration, strangulation, spontaneous rupture or perforation are serious complications that may be encountered in the course of umbilical hernia.

In this study, we aimed to determine the incidence of spontaneous closure in patients diagnosed with umbilical hernia and the factors affecting it, complications that may develop in follow-up, the indications for surgery, and the points to be considered while planning the follow-up of the patients.

MATERIAL and METHODS

This study was approved by the academic board of Dr. Sami Ulus Gynecology and Obstetrics Training and Research Hospital and was registered as 22/7 on 19/03/2009.

The study included children who were diagnosed with an umbilical hernia and received treatment at our clinic between January 2006 and December 2011. Conservative management was proposed for patients diagnosed with umbilical hernia who were aged under four. Families were educated about umbilical hernia and emergency situations were explained. Patients were

scheduled for regular check-ups at intervals of 3-6 months. Surgery was advised for patients over four years old with umbilical hernia. Patients with incarceration or strangulation underwent surgery urgently.

In this retrospective cohort study, we examine the current sizes of umbilical hernias, comorbidities, and demographic characteristics of the patients. The patients were separated into three groups based on the Lassaletta classification, which is based on the sizes of the defects. Patients with umbilical defects smaller than 0.5 cm were categorised as group 1, whilst those between 0.5 cm and 1.5 cm were categorised as group 2, and those larger than 1.5 cm as group 3. The patients were additionally separated into 2 groups based on their clinical history. Those who completed follow-up were labelled as group A, and those who underwent surgery were classified as group B. The surgical data, complications, and postoperative follow-ups of those who received surgical intervention were assessed.

Statistical analysis was conducted using the SPSS 24.0 software package to determine the number of cases and ratios within the groups. Comparisons between ratios were made using Pearson's Chi-square test and Fisher's exact Chi-square test, while nonparametric comparisons of means for more than two groups were assessed using the Kruskal-Wallis Test. Pearson's chi-squared and Fisher's exact chi-squared tests were used to evaluate non-parametric data and when the number of parametric values was insufficient or the variances were not homogeneously distributed. A significance level of $p < 0.050$ was deemed significant in the analyses.

RESULTS

Between January 2006 and December 2011, a total of 1928 patients were diagnosed with umbilical hernia in our clinic. Of these patients, 1185 did not return for follow-up after diagnosis and 743 were followed up with periodic checks. The mean age at diagnosis was 1.1 ± 0.9 years (min 1 week - max 16 years), the mean age at surgery was 5.0 ± 0.6 years (min 2 months

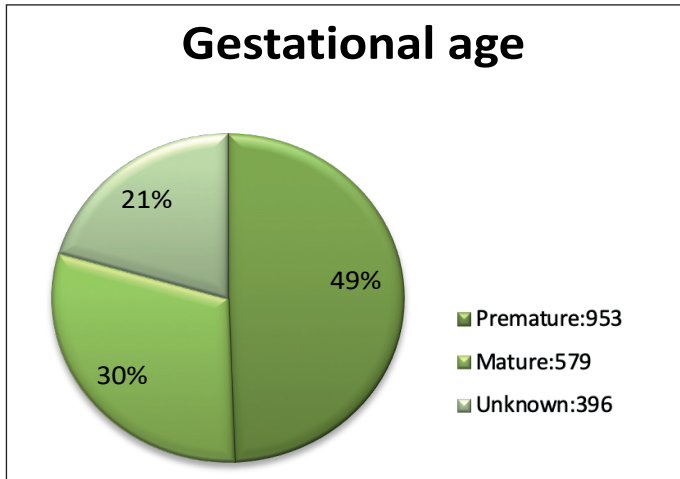


Figure 1: The Distribution of Gestational Age

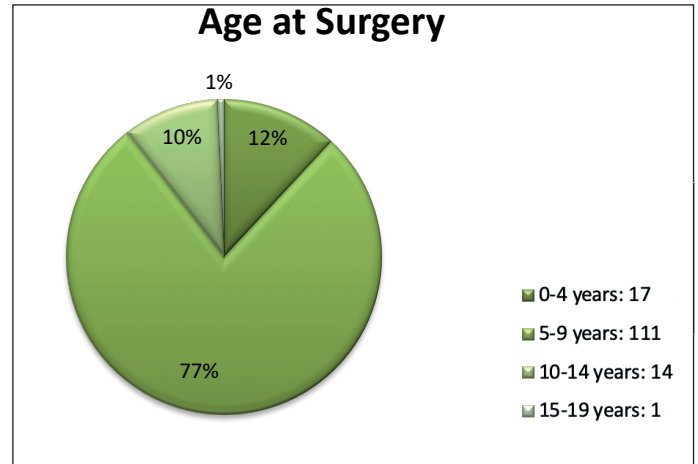


Figure 3: The distribution of age at surgery

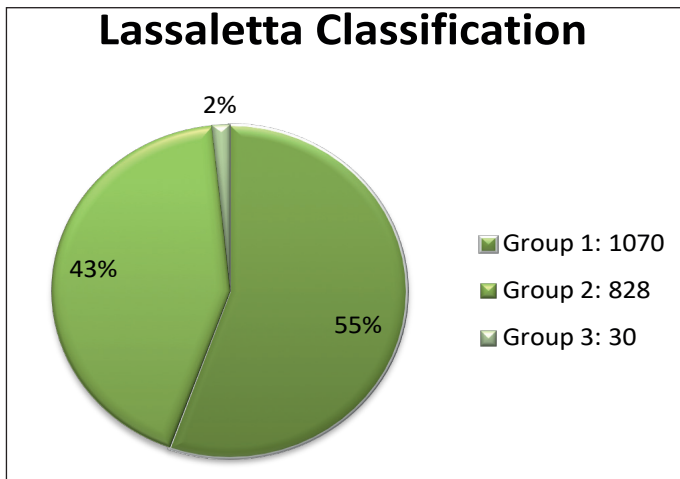


Figure 2: Classification of defect size at the time of diagnosis according to the Lassaletta Classification

- max 15 years). A total of 173 (8.9%) patients underwent surgery. The mean follow-up of all patients was 18.6 ± 7.3 months. Mean postoperative follow-up was 15.3 ± 7.4 months.

The sex, age group, gestational age and defect size of 1928 patients diagnosed with umbilical hernia were studied. In the study 1117 patients were male and 881 were female. The male/female ratio was 1.3 to 1 in patients with umbilical hernia. The gestational age of 396 patients was unknown. Almost half of the 1532 patients for whom gestational age data could be obtained had a history of preterm birth (25-36 weeks). The distribution is shown in Figure 1. 92% of patients were in the age group 0-4 years at the time of diagnosis.

The most common presenting symptom was umbilical swelling. 16% were diagnosed incidentally at our outpatient clinic for another reason. Other symptoms reported by families were itching and discolouration. When the size of the defect was classified, the patients were divided into 3 groups according to the Lassaletta classification. Their distribution is shown in Figure 2.

While 91% of the patients were recommended for follow-up, 9% underwent surgery. Twenty-eight (16%) of the 173 patients who were operated on were younger than 4 years of age and were operated on after the age of 4 years. These patients were included in the operated group.

Additional disease was found in 21.7% of patients. Diseases related to the inguinal region were found in 109 (47%) patients with inguinal hernia, 101 (44%) with hydrocele and 19 (9%) with undescended testicles. Diseases of the cardiovascular system were found in 26 patients. Central nervous system disorders were observed in 27 patients and urogenital disorders in 25 patients. Congenital hypothyroidism was present in 13 patients and a history of chronic constipation in 67 patients.

When the relationship between defect size and clinical outcome was evaluated, 68% of patients in group 1 had spontaneous closure of the defect at follow-up, while this rate was 51% in group 2 and 42% in group 3 (Table I). As defect size increased, the rate of spontaneous closure decreased and this difference was statistically significant ($p = 0.001$). It was observed that the rate of surgery in group 3 was more than double that of the other two groups. This difference was statistically significant ($p = 0.001$). In group 3, 11 (58%) patients (4 girls/ 7 boys) whose umbilical defect did not close spontaneously had inguinal pathology in 2 (18%), Down syndrome in 1 (9%) and CNS pathology in 1 (9%).

The rate of spontaneous closure was higher in males than in females in patients followed for umbilical hernia. The rate of surgery was higher in girls than in boys (Table II). These differences were statistically significant ($p=0.001$).

When the relationship between co-morbidities and defect size was examined, a statistically significant relationship was found. ($p=0.010$). Additional diseases were found in 21.7% of the patients. Group 1 patients had the highest rate of comorbidities (25.1%). It was found that co-morbidities did not influence spontaneous closure of the umbilical hernia ($p=0.214$).

Table I: The relationship between defect size and clinical course

	Lassaletta Classification			
	Group 1	Group 2	Group 3	Total
Clinical outcome				
Remained	12 (3)	15 (5)	0	27 (5)
Increased size	12 (3)	4 (1)	0	16 (2)
Spontaneous closed	284 (68)	154 (51)	8 (42)	446 (60)
Decreased size	10 (2)	70 (23)	1 (5)	81 (10)
Operated	99 (24)	64 (20)	10 (53)	173 (23)
Total	417	307	19	743(100)

$p=0.001$

Table II: The relationship between sex and clinical outcomes

	Boy	Girl	Total
Clinical outcome			
Remained	13 (3)	14 (5)	27
Increased size	9 (2)	7 (3)	16
Spontaneous closed	304 (68)	142 (48)	446
Decreased size	43 (9)	38 (14)	81
Operated	83 (18)	90 (30)	173
Total	452	291	743

$p = 0.001$

743 patients were followed up for umbilical hernia and 173 (23%) were operated over time. The 743 patients who came to the controls and whose prognosis was known were compared with those who were followed up and operated on.

The patients were divided into 2 groups according to follow-up and surgery. Followed patients were classified as group A and operated patients as group B. While 65% of the followed patients were male, 52% of the operated patients were female. Female patients had a higher rate of surgery. In both groups of patients, more than 50% were patients with a history of preterm birth. The most common complaint on admission to hospital in both groups of patients was swelling of the umbilical region (Table III).

Considering the age distribution at the time of diagnosis, almost all patients aged >4 years underwent surgery, whereas clinical follow-up was preferred in patients aged <4 years. Defect sizes were classified according to the Lassaletta classification and the distribution of defect sizes was found to be similar in both groups of patients (Table III).

173 patients underwent surgery for umbilical hernia. The age distribution of patients who underwent surgery is shown in Figure 3. Five patients (3%) were operated for emergency indications due to strangulation or incarceration.

The inverted smile incision above the umbilicus was most commonly used to repair the patients' defects. The infraumbilical smiley incision was the other incision chosen. The supra-umbilical transverse incision was chosen to repair both defects, especially in cases of epigastric hernia. In patients who underwent intra-abdominal surgery for another reason, the defect was repaired intra-abdominally (Table IV).

Table III: The Comparison of Follow-up and Operated Patients Datas

	Followed up (Grup A)	Operated (Grup B)	Toplam
Sex			
Boy	369 (65)	83(48)	452
Girl	201 (35)	90 (52)	291
Gestational age			
Premature	312 (55)	90 (52)	402
Mature	153 (27)	38 (22)	191
Unknown	105 (18)	45 (26)	150
Symptoms			
Umbilical Swelling	453 (79.7)	136 (79)	589
Incidentally	115(20)	33 (19)	148
Other Umbilical Complaints	2 (0.3)	4 (2)	6
Age at diagnosis			
0-4 years	567 (99.5)	77 (44)	644
5-9 years	3 (0.5)	77 (44)	80
10-14 years	0	18 (11)	18
15-19 years	0	1 (1)	1
Lassaletta Classification			
Group 1	318 (55)	99 (60)	417
Group 2	243 (44)	64 (36)	307
Group 3	9 (1)	10 (4)	19
Total	570	173	743

Table IV: The Surgical Data

Incision types	
Infraumbilical smile incision	12 (7)
Inverted smile incision above umbilicus	145 (83)
Transvers or abdominal	16 (10)
Total	173

Table V: Postoperative complications (n=173)

Stick abscess	6 (3)
Recurrence	3 (1.5)
Pain	3 (1.5)
Total	12 (6)

While 20 of the patients who underwent umbilical hernia repair also had an epigastric hernia, 15 patients had an inguinal hernia, 5 patients had an undescended testicle, 2 patients had hypospadias, 2 patients had an umbilical polyp, 1 patient had an urachal remnant and 1 patient had an ovarian cyst. Simultaneous repairs were performed.

17 (10%) of these patients were younger than 4 years. Two (12%) patients younger than 4 years were operated for incarcerated umbilical hernia. In other patients younger than four years, simultaneous umbilical hernia repair was performed for epigastric hernia in 13 (76%) patients, for umbilical polyp in 1 (6%) patient and for inguinal hernia in 1 (6%) patient.

The postoperative complications were hernia abscess, recurrence and persistent pain and were observed at a rate of 6% (Table V). When the relationship between the size of the defect detected at surgery and the development of

postoperative complications was examined, no statistically significant difference was found ($p=0.737$).

Postoperative recurrence occurred in 3 patients (2 girls, 1 boy). All three patients had a history of prematurity. The age at surgery was 1-3-8 years. The size of the defect was 0.5-1-2 cm. While 2 of these patients underwent simultaneous epigastric hernia repair and 1 inguinal hernia repair, one of these patients had Down syndrome and the other had a history of chronic constipation. The other patient was found to have CNS pathology.

While co-morbidity was observed in 21.7% of all patients, the rate of co-morbidity was found to be 33.3% in 12 patients who developed complications (1 with Down syndrome, 1 with CNS disease, 2 with chronic constipation). Epigastric hernia repair was performed simultaneously in 3 (25%) of these patients. Although the rate of additional disease was higher in patients with postoperative complications compared to all patients, no statistically significant difference was found ($p=0.528$).

In our study there were 5 (2%) patients who underwent emergency surgery for strangulation and entrapment. The age of the patients was 1-11 years (mean 3.8 years). It was observed that only 2 (40%) patients were younger than 4 years. The defect diameter was 1 cm in 4 patients and 1.5 cm in 1 patient. It was noted that the defect diameters of the patients were in group 2 of the Lassaletta classification.

Five (2%) of the inguinal hernia cases we operated on were operated on for incarceration. Incarcerated omentum was present in 3 of these patients and strangulation was observed in 2 patients. In one of the 2 patients with strangulation, perforation of the ileum segment in the hernia sac was observed and the perforated area was primarily repaired. In the other, the ileal segment was irrigated with warm saline. No patient required bowel resection.

DISCUSSION

In general, hernias are a very important part of paediatric surgical practice. Approximately 75% of anterior abdominal wall defects occur in the inguinal region, 10% are incisional hernias, 10% are umbilical and epigastric hernias, approximately 4% are femoral hernias and the remainder are rare hernias (spigelian hernia, lumbar hernia, ventral hernia, etc.) (2) .

Umbilical hernia is a common defect of the anterior abdominal wall in childhood. Although the defect is present at birth, unlike other childhood hernias, it may close spontaneously over time without the need for surgery (1). However, if these hernias do not close spontaneously, complications may develop that require emergency surgery (1).

The incidence of umbilical hernias has been reported to be the same in boys and girls (4,5). Zendejas et al. (5) reported

a male/female ratio of 1/1 in their study publishing their 53-year experience with umbilical hernia repair. In the study by Thomson et al. (6), this ratio was found to be 1/2,6 and was more common in girls. In our study, umbilical hernia was more common in males and the male/female ratio was 1.3/1. While this ratio was 1.4/1 in the group of patients recommended for follow-up, it was 0.9/1 in the group of patients recommended for surgery. It was observed that girls were more likely to be operated on for umbilical hernia than boys.

Most umbilical hernias present in childhood close by the age of 2 years, but the closure process may continue until the age of 5 years (2,4,7). A prospective study in Caucasian and African American populations showed spontaneous closure rates of 83-95% by 6 years of age (8). Another study reported that 50% of umbilical hernias that did not close by the age of 4-5 years could close by the age of 11 years (1). Because of the decreasing incidence of umbilical hernias with age and the tendency for spontaneous closure, it is widely accepted that patients should be followed clinically at regular intervals (1,2,4, 7-10). It is recognised that approximately 10% of all umbilical hernias remain unresolved into adulthood (2).

It was observed that umbilical hernias less than 0.5 cm in diameter tend to close spontaneously at around 2 years of age, and those with a defect diameter greater than 1 cm usually close by 4 years of age (11). Haller et al. (12) found that umbilical hernias did not close spontaneously in those with defects greater than 1.5 cm in diameter, in girls over 2 years of age, and in all children over 4 years of age, and recommended surgery in these patient groups. However, other authors in the literature have recommended that these patients should be followed up to the age of 5-7 years (8). In our study, patients under 4 years of age with umbilical hernia were followed up regularly. Those operated on before the age of 4 years were operated on urgently for incarcerated umbilical hernia or simultaneously for epigastric hernia, umbilical polyp, inguinal hernia.

Spontaneous closure of umbilical hernias can be predicted by looking at the diameter of the defect and the sharpness of the fascia at the edge of the defect. Defects larger than 1.5-2 cm are unlikely to close spontaneously. Papagrigoriadis et al found that the likelihood of spontaneous closure was low in those with an umbilical defect >2 cm (13). In our study the rate of spontaneous closure was 62%. This rate was 48% in female patients and 68% in male patients. A higher rate of spontaneous closure was observed in males. In our study it was observed that the umbilical defect closed spontaneously by the age of 4 years in 68% of patients in group 1, 51% of patients in group 2 and 42% of patients in group 3. Spontaneous closure was lower in patients with a defect diameter >1.5 cm and it was observed that the rate of spontaneous closure decreased with increasing defect size.

Complications of umbilical hernia are very rare and incarceration and strangulation are commonly reported in the literature. The

complication rate varies between 6-37% in different reports (13-19).

Chirdan et al. (16) repaired 52 umbilical hernias and incarceration was the indication for surgery in 44.2% of cases. It has been argued that incarceration in umbilical hernias is a rare complication, contrary to what has been reported in the literature (16). In our study there were 5 (2%) patients who underwent urgent surgery due to incarceration. Strangulation was found in only 2 patients (1%). It was noted that the rates of incarceration and strangulation were low when compared in the literature.

It is not clear why some umbilical hernias are incarcerated and others have an asymptomatic clinical course. Lassaletta et al. (20) found that a defect diameter of 0.5-1.5 cm doubled the risk of incarceration. Defects smaller than 0.5 cm are thought to be too small for the intestine to enter, and in defects larger than 1.5 cm, incarceration does not develop because the intestine entering the defect can easily exit (16,20). In our study there were 5 cases of incarcerated umbilical hernia. While the defect diameter in four of them was 1 cm, the defect diameter in one patient was 1.5 cm, and all of them were in Lassaletta group 2. In our study, incarceration was significantly higher in Lassaletta group 2, similar to the literature.

It has been argued that incarceration and strangulation are usually detected in infants younger than 6 months (17,21,22). In our study, the median age of patients with incarcerated umbilical hernia was 4 years (min 1 year-max 11 years). This completely contradicts the reports in the literature that the risk of incarceration increases with younger age. Therefore, the opinion that age is a determining parameter in umbilical hernia incarceration is contradictory. The data from our study support that it is safe to wait for spontaneous closure of umbilical hernias until the age of 4 years.

Zendejas et al. (5) found that there was no association between incarceration and sex, whereas Lassaletta found incarceration mainly in male patients. In our study, 60% of the patients who underwent emergency surgery for incarceration were girls, and the incarceration rate was higher in girls.

The most common postoperative complications after umbilical hernia repair have been defined as wound infection, pain and recurrence, but they are very rare (16,19,22). In the Zendejas study, 96% of 489 children with umbilical hernia who underwent surgery had no postoperative complications. Recurrence was observed in 2% of patients, wound infection in 1% and haematoma in 1%. Repair technique, incision shape, hernia size, sex, prematurity and operative age were not associated with recurrence (5).

In our study, postoperative complications were found in 6% of the operated patients. The most common postoperative complication was rod abscess, which occurred in 6 patients (3%). Recurrence was observed in 3 patients (1.5%) and these

patients underwent reoperation. Our complication rates were found to be consistent with the literature.

CONCLUSION

In our study we found that umbilical hernia was more frequent in boys, but the size of the defect was larger, the risk of incarceration was higher and the rate of spontaneous closure was lower in girls.

In conclusion, conservative management is still the most accepted and safest method of treating umbilical hernia in children under 4 years of age. In the absence of emergency complications in children under 4 years of age, there is no indication for surgery. In this condition, which tends to close spontaneously, the safest method is to explain the signs of incarceration to the family and to follow up regularly. Spontaneous closure is unlikely in umbilical hernias that persist beyond the age of four. Primary repair is recommended to prevent complications that may develop later in adulthood.

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