



Clinical Value of Ultrasonic Examination of the Contralateral Side of Pediatric Patients with Congenital Inguinal Hernia

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببنا لك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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Dedication

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List of Contents

| Title | Page No. |
|---|-----------------|
| List of Tables..... | i |
| List of Figures..... | ii |
| List of Abbreviations | v |
| Abstract | vi |
| Introduction | 1 |
| Aim of the Work | 4 |
| Review of Literature | |
| ▪ Embryology of The Inguinal Canal..... | 5 |
| ▪ Anatomy of the Inguinal Canal in Infancy and Childhood..... | 8 |
| ▪ Pathogenesis of Inguinal Hernia in Pediatrics..... | 12 |
| ▪ Incidence of Inguinal Hernia in Pediatrics | 14 |
| ▪ Clinical Manifestations of Inguinal Hernia in Pediatrics | 16 |
| ▪ Management of Inguinal Hernia in Pediatrics..... | 18 |
| ▪ Policy of Management of the Contralateral Sides in Pediatrics with Unilateral Inguinal Hernia..... | 26 |
| Patients and Methods..... | 52 |
| Results | 55 |
| Discussion..... | 74 |
| Summary | 84 |
| Conclusion | 86 |
| References | 88 |
| Arabic Summary | — |

List of Tables

| Table No. | Title | Page No. |
|--------------------|--|-----------------|
| Table (1): | Length (in cm) of the inguinal canal in age groups < 10 years of age | 11 |
| Table (2): | Age and sex distribution of the study groups patients..... | 55 |
| Table (3): | Distribution of study groups patients according to sex and side of presenting hernia..... | 56 |
| Table (4): | US findings of the symptomatic side group (110 groins). | 58 |
| Table (5): | US findings of the asymptomatic side group (110 groins). | 59 |
| Table (6): | Results of US of the asymptomatic side related to age groups..... | 60 |
| Table (7): | US findings in asymptomatic groins according to sex and side of presentation. | 61 |
| Table (8): | The operative findings in the asymptomatic group, proved previously by US to have positive findings, related to age..... | 64 |
| Table (9): | Comparison between the US and surgical exploration findings in relation to age and sex in the asymptomatic group..... | 65 |
| Table (10): | Comparison between the US and surgical findings in the contralateral side according to side of presenting hernia. | 67 |
| Table (11): | Evaluation of US findings according to surgical findings and follow up of contralateral side. | 69 |
| Table (12): | Evaluation of the preoperative US examination of the contralateral side in pediatric patients with unilateral inguinal hernia..... | 69 |

List of Figures

| Figure No. | Title | Page No. |
|-------------------|---|-----------------|
| Fig. (1): | Diagram of the embryologic development of the inguinal canal | 6 |
| Fig. (2): | Diagram of the inguinal canal and scrotum showing layer coverings of the spermatic cord and testes..... | 7 |
| Fig. (3): | Diagram of the inguinal canal and its contents..... | 9 |
| Fig. (4): | Diagram of the walls of the inguinal canal..... | 10 |
| Fig. (5): | Diagrams of the contents of the inguinal canal in male and female individuals..... | 10 |
| Fig. (6): | The normal anatomy of the inguinal region at term, and the various anomalies related to patency of the PV.. | 12 |
| Fig. (7): | The bulge (hernia) described by the parents which usually appears when the child coughs or strains..... | 16 |
| Fig. (8): | Examination for an inguinal hernia in pediatrics | 17 |
| Fig. (9): | Technique of inguinal hernia repair in male children | 21 |
| Fig. (10): | Hernia sac in a female..... | 22 |
| Fig. (11): | Relevant Anatomy of internal inguinal ring | 23 |
| Fig. (12): | Positioning of ports for laparoscopic hernia repair..... | 23 |
| Fig. (13): | Surgical technique for laparoscopic hernia repair..... | 25 |
| Fig. (14): | US image of a male PPV | 35 |
| Fig. (15): | Herniography..... | 41 |

List of Figures Cont...

| Figure No. | Title | Page No. |
|-------------------|---|-----------------|
| Fig. (16): | Diagram illustrates the imaging landmarks used for localization of the deep inguinal ring of the inguinal canal | 44 |
| Fig. (17): | US identification of the inguinal canal..... | 45 |
| Fig. (18): | US identification of the inguinal canal..... | 45 |
| Fig. (19): | Contralateral groin palpation and scrotum inspection..... | 47 |
| Fig. (20): | Laparoscopic 70° view versus 120° view in a right inguinal hernia pediatric male..... | 51 |
| Fig. (21): | Age and side of the presenting hernia distribution of the studied males group. | 58 |
| Fig. (22): | Age and side of the presenting hernia distribution of the studied females group. | 58 |
| Fig. (23): | US findings of the symptomatic side group (110 groins)..... | 59 |
| Fig. (24): | US findings in the asymptomatic side group (110 groins)..... | 59 |
| Fig. (25): | US findings in the in asymptomatic contralateral groins in relation to age..... | 61 |
| Fig. (26): | US findings in the in asymptomatic contralateral groins in relation to sex. | 62 |
| Fig. (27): | US findings the in asymptomatic contralateral groins in relation to the side of presenting hernia..... | 62 |
| Fig. (28): | The distribution or the results of operative exploration in the contralateral side, proved previously by US to have positive findings, in relation to age (39 cases)..... | 65 |
| Fig. (29): | Comparison between US findings and surgical exploration findings in relation to age group. | 67 |

List of Figures Cont...

| Figure No. | Title | Page No. |
|-------------------|---|-----------------|
| Fig. (30): | Comparison between US and surgical exploration findings in relation to gender..... | 67 |
| Fig. (31): | Comparison between the US and surgical findings in the contralateral side according to side of presenting hernia. | 68 |
| Fig. (32): | Normal contralateral inguinal canal (Right) in a 2 months old boy presented with left inguinal hernia. The width of the internal inguinal ring is 3.0 mm. | 70 |
| Fig. (33): | Left inguinal hernia that has bowel loops is the inguinal canal in a 2.5 years old boy. The width of the internal inguinal ring is 9.4 mm. | 70 |
| Fig. (34): | Indirect inguinal hernia in that demonstrates bowel loops and fluid in the hernia sac of 4 years old boy. | 71 |
| Fig. (35): | The right contralateral side of a patient presenting with left hernia showing widening cord at the level of the internal inguinal ring by 4.5 mm. Arrows show the landmark of the internal inguinal ring..... | 71 |
| Fig. (36): | Left contralateral inguinal canal with the width of internal inguinal ring is 4.4 mm at rest..... | 72 |
| Fig. (37): | The same patient in (fig. 36), left contralateral inguinal canal with a width of internal inguinal ring of 5.4 mm after straining (proved surgically)..... | 72 |
| Fig. (38): | Right inguinal hernia in 2.7 years old boy showing wide dilatation (9.5 mm) of the internal inguinal ring with bowel loops and omentum contents (proved surgically). | 73 |

List of Abbreviations

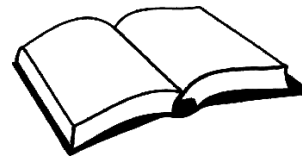
| Abb. | Full term |
|-------------|--|
| ASIS..... | Anterior Superior Iliac Spine |
| CIH | Contralateral Inguinal Hernia |
| CPPV | Contralateral Patent Processus Vaginalis |
| CT | Computed Tomography |
| LH | Left Hernia |
| MCIH..... | Metachronous Contralateral Inguinal Hernia |
| MRI..... | Magnetic Resonance Imaging |
| NICU..... | Neonatal Intensive Care Unit |
| PPV | Patent Processus Vaginalis |
| PV | Processus Vaginalis |
| RH..... | Right Hernia |
| SGS | Silk Glove Sign |
| US | Ultrasonography |

Abstract

In this research, 110 infants and children (96 boys and 14 girls) with clinically diagnosed unilateral inguinal hernia, with ages ranging from 1 month to 11 years, were subjected to preoperative ultrasonographic examination on the contralateral asymptomatic side. The examination revealed the presence of a hernia sac (or patent processus vaginalis) in the contralateral groin in 39 cases (35.5%). Those with positive ultrasonographic findings "such as viscera or fluid in inguinal canal or widening of the internal inguinal ring", underwent surgical exploration of the contralateral side, and a true hernia sac was detected in 36 of them (92.3%). The other cases were followed up for a period ranged from 6 months to one year and a hernia appeared in the contralateral side in 2 boys of them.

The research demonstrated the importance of ultrasonic examination of the contralateral side in pediatric patients with a unilateral inguinal hernia especially in the first 2 years of life since it is noninvasive, cheap, available and reliable. Its accuracy in detecting the contralateral clinically inapparent inguinal hernia in pediatric patients is up to 95.5% which prevents a great percentage of children from being exposed to another surgical procedure.

Keywords: Inguinal Hernia – Metachronous Hernia – Contralateral Hernia – Occult Hernia – Ultrasonic.



Introduction

INTRODUCTION

The word “hernia” is derived from a Latin term meaning “a rupture”. The earliest reports of abdominal wall hernias date back to 1500 BC. During this early era, abdominal wall hernias were treated with trusses or bandage dressings (*Zinner and Ashley., 2012*).

The incidence of pediatric inguinal hernia ranges from 0.8 to 4% in children and is highest in infants, especially in premature children, and decreases as children age. If left untreated, one of the major complications of inguinal hernia is incarcerated hernia, which is an emergency that can lead to intestinal gangrene and gonadal atrophy (*Chang et al., 2016*).

Inguinal hernia repair is performed on an elective basis, except in patients who have experienced with incarceration. Some studies advocate early intervention to prevent incarcerated hernia because prematurity and prolonged waiting after diagnosis were reported be significant risk factors (*Zamakhshary et al., 2008*).

The incidence of inguinal hernia in females is 1.9%, the ratio of boys to girls being 6:1. The site of presentation being 68.1% on the right side, 23.4% on the left and 8.5% bilateral. About 15-20% hernias in infant girls contain ovary and Fallopian tube (*Karabulut., 2011*).

In term infants, the processes vaginalis is usually closed at birth, but it remains patent in 15% to 37% of people. In

premature infants, the incidence of closure is much higher, depending on the gestational age at the time of birth. The continued patency of the processus vaginalis (PV) is the principal factor in the development of congenital hernias and hydroceles (*Davis and Cladis., 2016*).

A long standing and still unanswered problem concerns the evaluation of the contralateral side of the groin in infants and children who have an inguinal hernia manifest on only one side, since clinically inapparent inguinal hernia can be found on the opposite side in many of them (*Moss and Am., 1991*).

In one large study with an average follow-up interval of 20 years after a unilateral hernia repair in childhood, a contralateral hernia ultimately develop in 29% of patients. In other study, 47% of the children who underwent a unilateral repaired within their first year of life ultimately required reoperation on the opposite side (*Skinner and Grosfeld., 1993*).

Therefor some surgeons routinely perform bilateral inguinal exploratory surgery regardless of clinical findings, while others prefer to operate only on the side that clinically manifests a hernia (*Chou et al., 1996*).

Several methods have been advocated to minimize the frequency of negative exploration of the contralateral side in children presenting with a unilateral congenital inguinal hernia, such as herniography, diagnostic pneumoperitoneum, intra-operative laparoscopy, and recently ultrasonography (*Hashish and Mashaly., 2006*).

Intraoperative pneumoperitoneum by oxygen insufflation was attempted to determine the presence of a contralateral patent processus vaginalis (CPPV), but the results were not encouraging (*Curses et al., 1994*).

Laparoscopy was introduced as a tool for the diagnosis of CPPV. If CPPV is observed laparoscopically, the PPV can be repaired through a groin incision or laparoscopy. Transinguinal laparoscopy (inguinoscopy) has been shown to be a safe, accurate and effective method of evaluating the contralateral side (*Lee et al., 2015*).

Ultrasonography (US) is so widely available, noninvasive, rapid, reliable, convenient and easily performance screening technique for inguinal hernias in infants and children. It can also decrease the time of diagnosis, provide prognostic information, and used to perform therapeutic intervention. It can provide up to 100% accuracy rate for preoperative diagnosis of direct inguinal hernia, which could be misdiagnosed by clinical examination (*Karen and John., 2015*).

Establishing accurate sonographic criteria for inguinal hernia and PPV is an important tool for the pediatric surgeon to plan the approach before groin surgery (*Erez et al., 2002*).

The low incidence and benign nature of contralateral hernia development in infants undergoing a unilateral inguinal herniotomy does not justify routine contralateral groin exploration (*Ballantyne et al., 2001*).