

VILNIUS UNIVERSITY

LINA GEIMANAITĖ

**EVALUATION OF THE CAUSES, DIAGNOSTIC CRITERIA, SURGICAL  
TREATMENT AND FOLLOW-UP RESULTS OF OVARIAN TORSION IN  
CHILDREN**

Summary of Doctoral Dissertation  
Biomedical Sciences, Medicine (06B)

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The Doctoral Dissertation was prepared at Vilnius University in 2008 – 2012.

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Adress: Santariškių str. 7, Vilnius, Lithuania

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The Doctoral Dissertation is available at the Library of Vilnius University.

VILNIAUS UNIVERSITETAS

LINA GEIMANAITĖ

VAIKŲ KIAUŠIDŽIŲ UŽSISUKIMO PRIEŽASČIŲ, DIAGNOSTIKOS KRITERIJŲ,  
CHIRURGINIO GYDYMO IR ATOKIŲJŲ REZULTATŲ VERTINIMAS

Daktaro disertacijos santrauka  
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## **ABBREVIATIONS**

CDS – color Doppler sonography  
CI – confidence interval (statistics)  
df – degree of freedom (statistics)  
OR – odds ratio (statistics)  
OT – Ovarian Torsion  
SD – standard deviation (statistics)  
US – ultrasound  
WBC – white blood cells

## **INTRODUCTION**

Ovarian torsion (OT) is a rare children's acute abdominal disease which is difficult to diagnose and there is no consensus among scientists how to treat it. Currently any descriptions of the criteria for the evaluation of the viability of the ovarian tissue are absent, it is therefore not clear what to do with an ovary – should it be removed or detorsed and therefore the ovary should be left in the abdominal cavity. If a decision is made to carry out ovarian detorsion, this raises questions regarding the likelihood of a relapse and fixation of the ovary (ovariopexy). There is an uncertainty of failure to diagnose a malignant tumor that may be the cause of the ovarian torsion. Up to now no investigation has been conducted on how torsion and ischemia affect ovarian function, puberty and fertility after detorsion.

The main question of the thesis is whether detorsion should be carried out and therefore the ovary should be left in the abdominal cavity regardless of the duration of the disease, ultrasound characteristics, pathologic findings, macroscopic appearance and blood flow during surgery?

## **THE AIM OF THE STUDY**

To evaluate the causes, optimal diagnostic criteria, surgical treatment, and follow-up results of ovarian torsion in children as well as to create practical recommendations to clinicians and paediatric surgeons.

## **TASKS OF THE STUDY**

1. To evaluate the causes of ovarian torsion in children.
2. To evaluate the importance of clinical, laboratory and ultrasound tests for the diagnosis of ovarian torsion in children.
3. To evaluate the safety of the surgical strategy with respect to ovarian torsion in children.
4. To evaluate retrospectively the possibility of the ovarian salvage on the basis of histopathological findings in the ovaries removed.
5. To evaluate the efficiency of the conservative surgical strategy with respect to ovarian torsion in children based on the follow-up treatment results.

## **SCIENTIFIC NOVELTY OF THE STUDY**

This is the first scientific research in Lithuania which analyses causes, optimal diagnostic criteria, and the strategy, methods, surgical treatment, and follow-up results of ovarian torsion in children. This is the largest research of the follow-up results of the conservative surgical treatment in the world. There are few publications on this topic in the world and none of those in Lithuania.

## **DEFENDED STATEMENT**

It is safe and efficient to carry out detorsion of the twisted, enlarged, and changed (blue-black) ovary and therefore leave the ovary in the abdominal cavity, because both the ovarian tissue which displays macroscopic necrosis and the formation of follicle are retained even after a prolonged ischemic period.

## **MATERIALS AND METHODS**

The research was conducted at the Children's Hospital, Affiliate of Vilnius University Hospital Santariskiu Klinikos (Children's Surgery Centre of the Clinic of Gastroenterology, Nephrourology, and Surgery). Permit No. 158200-02-293-69 was granted for the research by Vilnius Regional Biomedical Research Ethics Committee. The patients who underwent surgical intervention for OT between 1 January 1989 and 1 April 2012 at the divisions of the Children's Surgery Centre were studied.

The study included female patients between 0 and 18 years of age who underwent

surgical intervention for OT, regardless of the method of surgery and the cause of OT. Female patients who were diagnosed fallopian tube torsion, cysts, and tumor without ovarian torsion or blood flow disorders as well as patients who were suspected having ovarian torsion, but no torsion was identified during surgery, were excluded from the research. A total of 50 patients were included in the research who underwent 53 ovarian torsion surgeries: 22 ovariectomies and 31 ovarian detorsions by leaving an ovary in the abdominal cavity.

Patients were divided into 2 groups: girls who underwent ovariectomy and girls who underwent ovarian detorsion by leaving an ovary in the abdominal cavity.

The research was divided into two phases. In phase one, a retrospective data analysis was carried out for 40 patients treated between 1 January 1989 and 31 December 2008. Case histories and outpatient cards were used. From 1 January 2009 to 31 March 2012, 10 girls were treated for OT at the Children's Surgery Centre. These girls were interviewed on the basis of the questionnaire. After surgery (4–6 weeks, 3–4 months, 5–7 months, 8–12 months, and 18 and more months) color Doppler sonography (CDS) was performed.

In phase two, the patients who underwent ovarian detorsion by leaving an ovary in the abdominal cavity, regardless of the duration of the disease and the appearance of the ovary during surgery, were selected. Patients who later underwent ovariectomy due to the tumour of the detorsed ovary and patients who due to previous ovariectomy had only one detorsed ovary were excluded from phase two of the research. In phase two, 21 (75%) patients were studied. They were interviewed on the basis of the questionnaire; signs of puberty using Pavilonis' methodology for girls under 18 were assessed; hirsutism was graded according to the Ferriman – Gallwey scale; and ovaries were US examined using CDS – ovarian size, volume, structure, blood flow, and lesions were evaluated. A healthy ovary was treated as a control ovary. The healthy ovary compensates for the production of sex hormones, therefore sex hormones were not examined.

**Statistical analysis.** The statistical data analysis was performed using the data collection and analysis packages SPSS 19.0 and Statistica 6.0. The quantitative variables were described as the arithmetic mean and the standard deviation (SD). The analysed characteristics of the groups of patients were described using the general statistics

concepts of situation, dispersion and symmetry. The continuous variable was verified under an assumption of normality using the Kolmogorov-Smirnov test. To verify the statistical hypotheses, the significance level chosen was 0.05. The parametric Student's t-test and the non-parametric Mann-Whitney test were used to compare average scores of two independent groups whereas the parametric paired t test and the nonparametric Wilcoxon signed-rank test were used to compare two dependent groups. The normality of the quantitative variables was verified using the Kolmogorov-Smirnov test. The correlation of qualitative characteristics was assessed using the chi-square ( $\chi^2$ ) test. Depending on the sample sizes, the exact (for small samples) and symptomatic  $\chi^2$  criterion were used. For outcome prediction – given the values of the studied characteristics that were significantly different in the comparative statistical analysis – a binary logistic regression analysis was applied. To identify the connection between characteristics, the correlation coefficient was used.

## RESULTS

From 1 January 1989 to 30 June 2012, 50 girls underwent 53 ovarian torsion surgeries at the surgery unit of the Children's Hospital: 22 (41.5%) ovariectomies and 31 (58.5%) ovarian detorsions by leaving an ovary in the abdominal cavity. The age of the patients ranged from 2 months to 17.9 years of age, on average – 10.43 (5.12) years of age.

**Evaluation of the causes of the ovarian torsion.** During the entire study period 29 (54.72%) ovarian torsions in ovaries without pathology and 24 (45.28%) ovarian torsions with pathologic findings were diagnosed. Ovarian cysts accounted for 62.5% of all pathologic findings in the twisted ovaries. The second most common pathologic finding was a mature ovarian teratoma which accounted for 25% of all pathologic findings in the twisted ovaries (Table 1).

Division of the patients into two groups according to menarche as the functional ovarian maturation index showed that 13 (54.2%) patients diagnosed with pathology were premenarchal girls and 11 (45.8%) were postmenarchal girls. There was a statistically significant evidence that premenarchal girls were diagnosed with mature teratomas in the twisted ovaries ( $p=0.0304$ ) more often than postmenarchal girls. Postmenarchal girls were not diagnosed with mature teratomas.



**Table 1.** Pathologic findings in the twisted ovary

Pathologic findings in the twisted ovary	N	%
Cysts:	15	62.5
Follicular	4	
Corpus luteum	1	
Serous	1	
Histologically unspecified	9	
Paraovarian cyst	1	4.2
Serous cystadenoma	2	8.3
Mature teratoma	6	25

Statistically, no difference in the amount of cysts, paraovarian cysts, and serous cystadenomas was identified in these groups (Table 2).

**Table 2.** Pathology of ovary in premenarchal and postmenarchal girls

Pathology of ovary	Premenarchal girls n (%)	Postmenarchal girls n (%)	p
Cysts	7(29.2%)	8(33.3%)	0.688
Paraovarian cyst	-	1(4.2%)	0.458
Serous cystadenoma	-	2(8.3%)	0.199
Mature teratoma	6(25%)	-	0.030
Total	13(54.2%)	11(45.8%)	

None of the girls was diagnosed with a malignant tumour of the twisted ovary.

Division of the patients into two groups according to the surgical strategy showed absence of any significant difference ( $p=0.51$ ) in the number of pathologic findings in both the case of ovariectomy and ovarian detorsion by leaving an ovary in the abdominal cavity, although Table 3 shows twice as high incidence of ovarian cysts in the group with salvaged ovaries and twice as high incidence of mature teratomas in the group with removed ovaries. Two mature teratomas were found in the group with salvaged ovaries.

**Table 3.** Pathologic findings in the salvaged and removed ovaries

<b>Pathologic findings</b>	<b>Salvaged ovary n (%)</b>	<b>Removed ovary n (%)</b>	<b>p</b>
Cysts	10 (41.7)	5 (20.8)	0.544
Paraovarian cyst	1 (4.2)	-	1.00
Serous cystadenoma	1 (4.2)	1 (4.2)	1.00
Mature teratoma	2 (8.3)	4 (16.6)	0.219
Total	14 (58.3)	10 (41.7)	0.51

Of 53 ovarian torsions 34 (64.2%) were in the right ovary and 19 (35.8%) in the left ovary. No statistically significant difference between the groups was identified during the examination of the side of the twisted ovaries ( $\chi^2=0.419$ ,  $df=1$ ,  $p=0.518$ ) (Table 4).

**Table 4.** Side of the ovarian torsion

<b>Side of the ovarian torsion</b>	<b>Salvaged ovary n(%)</b>	<b>Removed ovary n(%)</b>
Right	21(39.6)	13(24.5)
Left	10(18.9)	9(17)

**Evaluation of clinical, laboratory and ultrasound tests.** The following clinical and laboratory symptoms were evaluated: abdominal pain, vomiting, fever, dysuria and defecation dysfunction, palpation for abdominal mass, and leukocytosis (Table 5).

Of the total sample, 26 (49.1%) patients did not define abdominal pain; of these, 11 (20.7%) girls were between 0.21 to 5 years of age and because of their age could not assess pain. Localisation of pain was defined by 38 (71.7%) patients; 15 (28.3%) patients complained about non-localised abdominal pain, of which 2 were babies, 7 girls under 5 years of age, and 6 girls were over 5 years of age. In the case of 4 (7.5%) patients pain was spreading to the groin and in the case of 2 (3.8%) patients it was spreading to the waist. From two weeks to one year prior to ovarian torsion, 13 (24.53%) patients had similar pain complaints.

**Table 5.** Frequency of clinical symptoms

Symptom	Number of patients n=53	%
Abdominal pain:	53	100
Spasmodic	23	43.4
Regular	4	7.5
Not defined or mixed	26	49.1
Localised	38	71.7
Non-localised	15	28.3
Vomiting:	45	84.9
1-2 times	15	28.3
repeated	30	56.6
Fever prior to surgery	31	58.5
subfebrile	19	35.8
febrile	12	22.6
Dysuria	4	7.5
Defecation dysfunction	3	5.7
Palpation for abdominal mass	17	32.1
through the abdominal wall	4	7.6
per rectum	13	24.5
Abdominal tenderness	28	52.8
WBC $\geq 10 \times 10^9/l$	37	69.8

Vomiting episodes were specified by 45 (84.9%) girls: 30 (66.7%) of them vomited repeatedly. Seven (15.6%) out of 45 patients reported that vomiting started together with abdominal pain. Fever before surgery was identified in 31 (58.5%) patients: subfebrile – 19 (61.3%) patients and febrile ( $>38^\circ\text{C}$ ) – 12 (38.7%) patients. All febrile patients had been ill for more than 25 hours (25–422 hours) before surgery (on average, 99.9 (108.9) hours) and the subfebrile patients had been ill on average 38.66 (24.04) hours (9–83 hours) before surgery. Urination and defecation dysfunction in girls with ovarian torsion was rare: four (7.5%) patients had painful and frequent urination, one (1.9%) patient had diarrhoea, and two (3.77%) patients had difficulty in passing stools. The leukocyte count in excess of  $10 \times 10^9/l$  was found in 37 (69.8%) patients, on average – 12.65 (4.58)  $\times 10^9/l$ .

Comparing the symptoms of the disease in the groups with ovariectomy and ovarian salvage, no statistically significant differences in the type and the location of the abdominal pain as well as the type of vomiting and fever were identified. The

comparison of the white blood cell count and haemoglobin in blood of the test groups showed no significant difference in the case of haemoglobin levels, but white blood cell count differed significantly (Student's t test:  $t=-2.075$ ,  $df=51$ ,  $p=0.043$ ) (Table 6).

**Table 6.** White blood cell count and haemoglobin

Test	Salvaged ovary		Removed ovary		p
	mean	SD	mean	SD	
WBC (x10.e9/l)	11.58	3.55	14.15	5.46	<b>0.043</b>
HGB (g/l)	131.06	11.12	129.45	12.48	0.632

All of these symptoms are not pathognomonic for ovarian torsion, therefore girls who were diagnosed with ovarian torsion preoperatively were selected. Preoperative diagnosis of ovarian torsion was in the case of 37 (69.8%) patients. The following clinical and laboratory symptoms of the disease were identified to these patients: abdominal pain – all 37 (100%) patients, vomiting – 33 (89.2%), fever – 18 (48.6%), palpation for abdominal mass through the abdominal wall or per rectum – 9 (24.3%), abdominal tenderness – 16 (43.2%), and leukocytosis – 27 (73%) patients. In most cases, 3–4 clinical and laboratory symptoms were identified in a patient (Table 7). The accurate diagnosis before surgery was confirmed in 13 (35.1%) girls who had 3 clinical and laboratory symptoms, and 17 (46%) girls who had four symptoms of the disease. The following three symptoms were found in 24 (64.9%) of 37 patients: abdominal pain, vomiting, and leukocytosis and in 16 (43.2%) patients – abdominal pain, vomiting, and fever.

The **ultrasound examination** before the surgery was performed on 46 (86.79%) patients. Ovarian enlargement was found in 45 (97.82%) patients. This is the most common symptom identified by the ultrasound scan. The second most common symptom is the presence of free fluid in the abdominal cavity. Multiple small cysts were found in 24 (52.17%) patients (Table 8). CDS evaluation showed blood flow disorders in 45.65% of the patients (n=21). Visible flow as peripheral flow only or central flow only is also attributed to ovarian blood flow disorders.

**Table 7.** Combinations of clinical and laboratory symptoms

Combinations of symptoms	Number of patients		%
	n	Total	
1 symptom abdominal pain	1	1	2.7
3 symptoms abdominal pain + vomiting + leukocytosis abdominal pain + vomiting + fever abdominal pain + vomiting + abdominal tenderness abdominal pain + leukocytosis + abdominal tenderness	5 3 4 1	13	35.1
4 symptoms abdominal pain + vomiting + fever + leukocytosis abdominal pain + vomiting + abdominal tenderness + leukocytosis abdominal pain + vomiting + leukocytosis + palpation for abdominal mass abdominal pain + vomiting + fever + palpation for abdominal mass abdominal pain + fever + leukocytosis + palpation for abdominal mass abdominal pain + fever + leukocytosis + abdominal tenderness	6 5 3 1 1 1	17	46
5 symptoms abdominal pain + vomiting + fever + + palpation for abdominal mass + abdominal tenderness abdominal pain + vomiting + fever + palpation for abdominal mass + leukocytosis abdominal pain + vomiting + fever + abdominal tenderness + leukocytosis	1 1 2	4	10.8
6 symptoms abdominal pain + vomiting + fever + palpation for abdominal mass + abdominal tenderness + leukocytosis	2	2	5.4

The vascular pedicle and the whirlpool sign were recorded in the case of 6 (13.04%) patients. In the case of four patients no flow was visible and in case of two patients a clear flow was visible in the vascular pedicle.

**Table 8.** Symptoms detected during the ultrasound examination and their frequency

Symptoms detected during the ultrasound examination	Number of patients	Symptom frequency %
Ovarian enlargement	45	97.82
Multiple small cystic structures	24	52.17
Changes in the ovary localisation	15	32.6
Free fluid in the abdominal cavity	25	54.34
Blood flow disorders in the ovary	21	45.65
Twisted vascular pedicle and the whirlpool sign	6	13.04

In the groups of the patients with salvaged ovary and removed ovary, records of blood flow disorders in the twisted ovary significantly differed ( $p=0.007$ ) whereas any other significant differences in the ultrasound features of ovarian torsion were not found.

In most cases, patients had 3–4 visible symptoms (63.1%), less frequently – 1–2 symptoms (23.9%), and even less frequently – 5–6 symptoms (13.1%). Only in one (2.2%) patient 6 symptoms were recorded during the ultrasound examination (Table 9).

**Table 9.** The number of the symptoms detected during the ultrasound examination

The number of the symptoms detected during the ultrasound examination	Number of patients (n=46)	%
1 symptom	4	8.7
2 symptoms	7	15.2
3 symptoms	16	34.8
4 symptoms	13	28.3
5 symptoms	5	10.9
6 symptoms	1	2.2

The analysis of the ultrasound examination findings showed that 21 (45.65%) patients were diagnosed with ovarian torsion by using an ultrasound; 14 (66.7%) patients were diagnosed with ovarian torsion when 3 and 4 symptoms were found during an ultrasound scan. Only in the case of 3 (14.3%) girls two symptoms found during an

ultrasound scan were sufficient for accurate diagnosis. Ovarian enlargement, multiple cysts in the periphery of the ovary and blood flow disorders in the ovary were the most common combination of symptoms which helped to establish the diagnosis of ovarian torsion and accounted to 32.6% of accurate diagnoses (Table 10).

**Table 10.** Combination of symptoms of ovarian torsion detected during the ultrasound examination

Combination of symptoms detected during the ultrasound examination	Number of patients		%
	n	Total	
2 symptoms		3	14.3
Ovarian enlargement + blood flow disorder	1		
Ovarian enlargement + localisation changes	2		
3 symptoms		6	28.6
Ovarian enlargement + cystic structures + blood flow disorder	1		
Ovarian enlargement + blood flow disorder + free fluid in the abdominal cavity	1		
Ovarian enlargement + blood flow disorder + hemorrhagic cyst	2		
Ovarian enlargement + localisation changes + hemorrhagic cyst	1		
Ovarian enlargement + cystic structures + free fluid in the abdominal cavity	1		
4 symptoms		8	38.1
Ovarian enlargement +cystic structures + blood flow disorder + fluid in the abdominal cavity	5		
Ovarian enlargement + blood flow disorder + fluid in the abdominal cavity + hemorrhagic cyst	1		
Ovarian enlargement + blood flow disorder + record of vascular pedicle + fluid in the abdominal cavity	1		
Ovarian enlargement + localisation changes + hemorrhagic cyst + free fluid in the abdominal cavity	1		
5 symptoms		3	14.3
Ovarian enlargement + cystic structures+ blood flow disorder + record of vascular pedicle + fluid in the abdominal cavity	3		
6 symptoms		1	4.8
Ovarian enlargement + cystic structures + localisation changes + blood flow disorder + record of vascular pedicle + fluid in the abdominal cavity	1		

To assess the enlargement of the twisted ovary, the ovarian volume and the size of the twisted ovary compared to the healthy ovary were evaluated. In 42 of 46 (91.3%) ultrasound examinations sizes of the twisted ovaries were measured, subsequently, calculations of the volume were made. The average volume (cm<sup>3</sup>) of the twisted ovary was 95.28 (74.52) (min 8.18 – max 381.49). The volume of the twisted ovary correlated with the age of a patient (correlation coefficient r=0.681). Since the age of the girls in the research was between 0 and 18 years and the standard ovarian sizes vary considerably depending on the age, the number of times the twisted ovary was larger than the healthy ovary was identified by dividing the volume of the enlarged ovary by the maximum volume of the healthy ovary. On average, the size of the twisted ovary increased 21.48 (17.06) times. The examination of the ovarian volume and the number of times the twisted ovary was larger than the healthy ovary in the groups of ovariectomy and ovarian salvation showed that the ovarian volume did not differ in both groups, while the difference in the number of times the twisted ovary was larger than the healthy ovary between the groups was statistically significant (Table 11). Therefore, the binary logistic regression analysis was applied and it was found that the odds ratio with respect to volume was not significant in the groups of patients if the age effect was excluded (for volume: p=0.127 OR 1.011 95% CI 0.997–1.025; for age: p = 0.093 OR 0.889 95% CI 0.775–1.020)

**Table 11.** Ovarian volume and ovarian enlargement

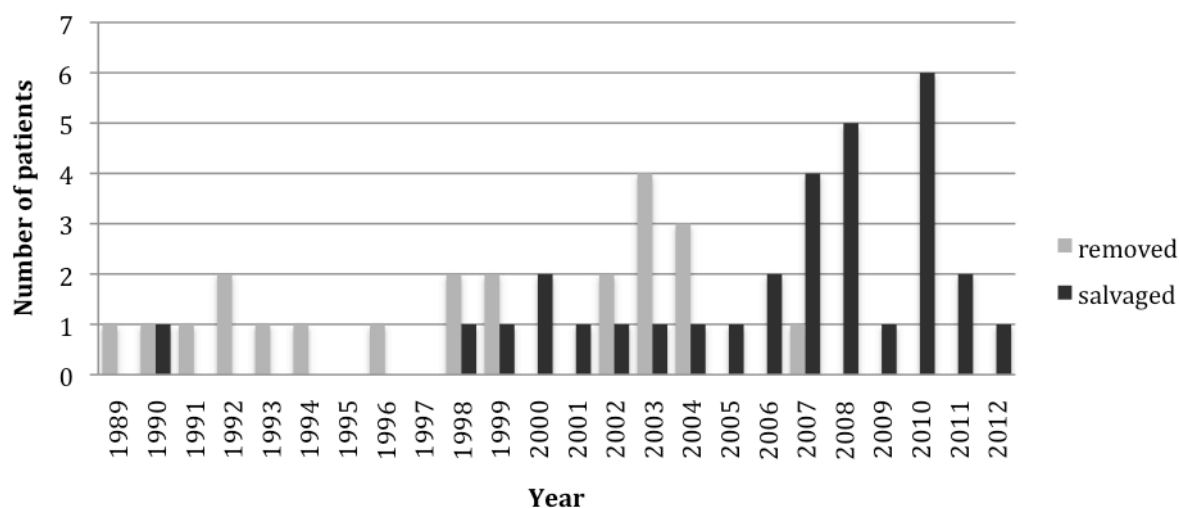
	<b>Salvaged ovary n=23</b>	<b>Removed ovary n=19</b>	<b>p</b>
Ovarian volume (cm <sup>3</sup> )	84.72(67.57)	108.07(82.18)	0.318
Ovarian enlargement (times)	15.11(8.93)	29.19(21.23)	<b>0.013</b>

**Evaluation of the treatment of ovarian torsion in children.** From 1 January 1989 to 30 June 2012, 50 girls were treated for 53 ovarian torsions. On average, 2.26 patients per year underwent surgery (Fig. 1). Between 1989 and 2004, 27 girls underwent 30 ovarian torsion surgeries: 21 ovariectomies of a twisted ovary and 9 detorsions of the ovary by leaving the ovary in the abdominal cavity after the blood flow



in the ovary had been resumed. Between 2005 and 2012, 23 girls underwent 23 ovarian torsion surgeries: 22 detorsions of the ovary by leaving the ovary in the abdominal cavity without waiting for the blood flow in the ovary to be resumed and one ovariectomy due to mature teratoma.

**Fig 1.** The number of ovariectomies and ovarian salvages



Of 53 ovaries 18 (34%) were blue, but after detorsion the blood flow was resumed and the ovaries were left in the abdominal cavity. In the case of 35 (66%) ovaries ischemia was deep, they were dark-blue/blue-black and after detorsion the blood flow was either not resumed or partially resumed. Comparing the macroscopic appearance of the salvaged and removed ovaries, no statistically significant difference between the groups was found ( $p=0.239$ ).

On average, the ovaries twisted 2.26 (1.13) times (min 0.3 – max 5). Comparing the number of twists in the groups of the salvaged and removed ovaries, no statistically significant difference was found ( $p=0.321$ ).

The average duration of torsion (disease) was 45.88 (60.77) hours. The duration of the disease in patients who underwent detorsion by leaving ovaries in the abdominal cavity was longer than those who underwent ovariectomy, but no statistically significant difference was found (Table 12). In the groups where blue-black ovaries were removed or salvaged no statistically significant difference in the duration of the disease was found

either, although in the group where ovaries were salvaged the girls were ill on average 13.36 hours longer.

**Table 12.** Duration of ovarian torsion before surgery

	<b>Salvaged ovary mean (SD)</b>	<b>Removed ovary mean (SD)</b>	<b>p</b>
Duration of torsion before surgery, h	46.74(76.22)	44.66(29.05)	0.904
Duration of torsion before surgery of blue-black ovaries, h	61.55(94.57)	48.19(31.1)	0.593

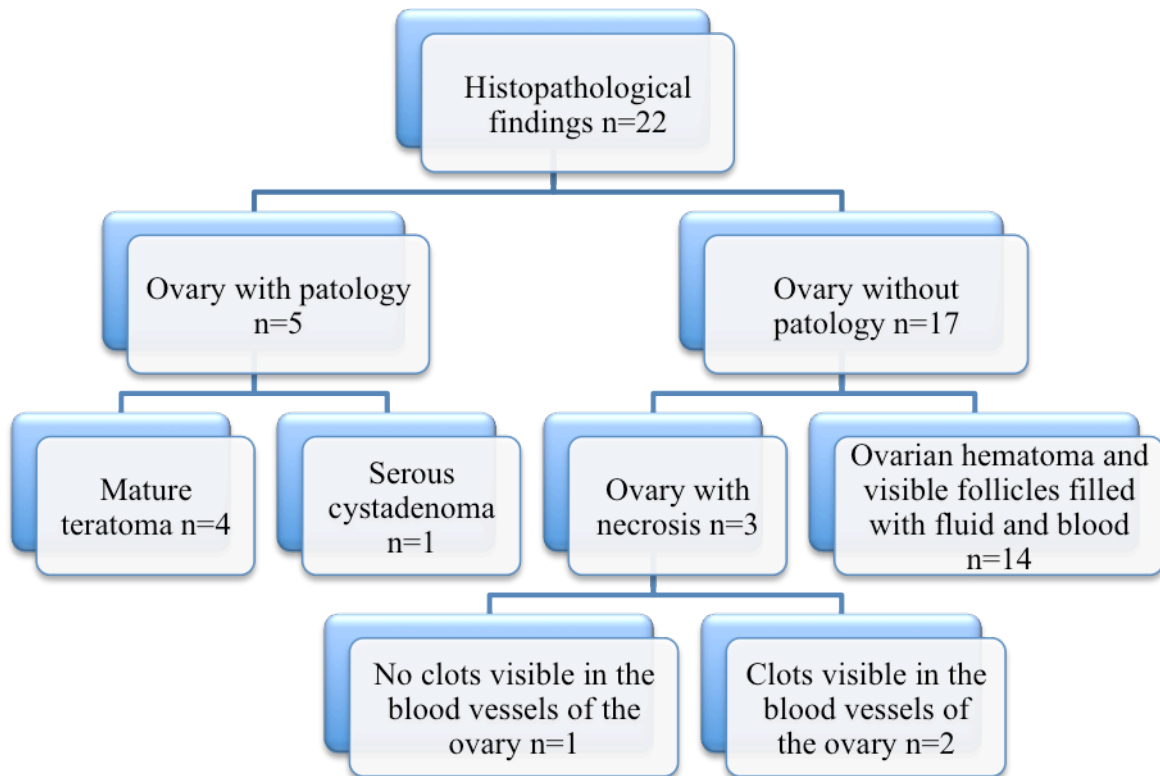
The duration of the ovarian torsion was analysed as a factor affecting the viability of the ovarian tissue. In terms of the duration of the ovarian torsion, patients were divided into those who were ill up to 24 hours, up to 48 hours, up to 72 hours, and more than 72 hours. The analysis showed that 26 (83.9%) girls who underwent detorsion by leaving ovaries in the abdominal cavity and 13 (59.1%) girls who underwent ovariectomy were ill for less than 48 hours (no statistically significant difference between these patients was found  $p=0.606$ ).

There were 7 ovaries detorsed and fixed to the abdominal wall and 5 ovaries detorsed and fixed to the dorsal surface of the uterus. Ovaropexy was performed in 12 (38.71%) detorsed ovaries that were left in the abdominal cavity: 7 right ovaries and 5 left ovaries. Eleven ovaries without pathology were fixed and in the case of one 16 year-old girl, after detorsion and fixation of the ovary, a follicular cyst was found in the ovary, moreover, unusually long ovarian ligaments could be seen.

No case of thromboembolism or peritonitis was diagnosed in the study of the girls with OT.

**Evaluation of the histopathological findings in the removed ovaries.** Histopathological examination was carried out for all 22 patients who underwent ovariectomy and 4 mature teratomas and 1 serous cistadenoma were detected (Table 13).

**Table 13.** Histopathological findings in the removed ovaries



Histopathological findings in the remaining 17 ovaries showed the following: hematomas and follicles filled with fluid and blood were found in 14 (82.35%) ovaries, necrotic areas were found in three ovaries, and clots were visible in the blood vessels of two ovaries.

Comparison of clinical symptoms, diagnostic characteristics, duration of torsion, and the number of twists in the removed ovaries where necrosis was identified (n=3) and the removed ovaries where necrosis was not identified (n=14) (Table 14) was conducted.

No statistically significant difference in the clinical symptoms, sonographic features, number of twists, and macroscopic appearance was identified in the groups during surgery. The duration of the ovarian torsion was different in the groups, yet no statistically significant difference was found.

**Table 14.** Comparison of clinical symptoms, diagnostic characteristics, duration of torsion, and the number of twists.

Symptom	Ovary without necrosis (n=14)	Ovary with necrosis (n=3)	p
Vomiting before surgery	10	2	1.00
Fever	9	3	0.515
Subfebrile	5	2	
Febrile	4	1	
Leukocytosis	12	2	0.465
WBC average	14.39(4.67)	10.8(5.36)	0.257
Ultrasonography:	12	3	1.00
Multiple small cystic structures	6	2	1.00
Free fluid in the abdominal cavity	3	1	1.00
Blood flow disorder in the ovary	3	-	0.535
Duration of torsion before surgery	42.29(21.69)	71.66(54.54)	0.344
Appearance of the ovary:			
Blue	4	1	1.00
Blue-black	10	2	1.00
Number of twists	2.46	2.33	0.565

**Evaluation of the follow-up results of the conservative surgical treatment.**

The follow-up results were studied for 21 (42%) girls and women. During the research, their average age was 14.91 (7.23) years. The youngest girl was 10 months and the oldest was 26.9 years of age. They were tested on average after 4.09 (3.92) years after surgery (min – 0.1, max – 13.5). Seven girls (33.3%) did not have menstrual cycle. Menarche in 14 girls and women was at the age of 13.08 (0.53) (min – 12.5; max – 14.5) years (this corresponds to the age of menarche in Lithuanian girls). None of the girls and women of the study who underwent the conservative surgical treatment of ovarian torsion was diagnosed with ovarian tumors. Excess hirsutism was not found (norm up to 8 points).

All girls and women of the study had an ultrasound examination of ovaries whereby the detorsed ovary left in the abdominal cavity was compared to the healthy (control) ovary. When comparing the volume of the right and left ovary where the right ovary was detorsed, it could be observed that the right ovary was slightly bigger, but no statistically reliable difference was noted. When comparing the volume of the ovaries where the left ovary was detorsed, it could be observed that the right ovary was slightly bigger, but the difference in size was not statistically significant (Table 15). During the ultrasound examination, no left ovary (that was detorsed) could be seen in one girl of 2.7 years of age. The repeat ultrasound examination was scheduled, but the girl did not come for testing.

**Table 15.** Comparison of the right and left ovary volume (cm<sup>3</sup>)

Twisted ovary	Right ovary		Left ovary		p
	mean	SD	mean	SD	
Right n=14	9.29	5.67	8.85	4.93	0.572
Left n=6*	10.04	7.15	9.29	6.18	0.463

\*except for one girl, where no left ovary was visible, therefore no volumes were compared

During the disease, the average ovarian volume of the girls and women of the study was 105.96 (95.16) cm<sup>3</sup>. In terms of size, the torsed ovary was 15.18 (8.5) times bigger compared to the healthy ovary. In terms of macroscopic appearance, five (23.8%) ovaries were blue and 16 (76.2%) ovaries were blue-black. The average duration of disease was 39.48 (36) hours (Table 16).

Multifollicular ovaries with blood flow were seen in 18 (85.72%) girls and women, one (4.76%) patient had torsion of paucifollicular ovary, one (4.76%) 10-month-old girl had microfollicular ovaries (equivalent to the age), and in case of one (4.76%) girl no ovarian torsion could be detected using US scan. Good conservative treatment results were recorded in 20 (95.23%) girls and women.

**Table 16.** Follow-up results of the conservative surgical treatment

No.	Age during ovarian torsion	Volume of the twisted ovary cm <sup>3</sup>	Ovarian enlargement (times)	Macroscopic appearance of the ovary	Duration of the disease (h)	Menstrual cycle during ovarian torsion	Age during the research	Period after surgical treatment of ovarian torsion (years)	Pathology of the twisted ovary detected during surgery
1	3.5	25.6	28.39	Bl	35.5	-	17	13.5	
2	15.9	138.6	9.24	Bl	48	+	26.9	11	FC
3	14.6	60.9	4.06	Bl	28	+	25.3	10.7	POC
4	13	182	11.97	Me	3	+	22	9	SC
5	15	104.7	6.98	BB	24	+	21.2	6.2	
6	17.5	381.5	25.43	BB	31	+	23	5.5	
7	15	267.9	17.86	BB	54.5	+	19.3	4.3	
8	6.2	45.1	28.25	BB	83	-	10.6	5.4	
9	9.6	79.1	28.23	BB	141	-	13.5	3.9	
10	11.8	85.3	22.9	BB	42	-	15.5	3.7	MT
11	11.5	93.25	24.54	BB	25	-	14	2.5	
12	16.4	179.5	11.97	BB	29	+	18.8	2.4	
13	16	163.9	10.93	BB	16	+	18.1	2.1	FC
14	11	89.5	23.9	BB	28	-	12.9	1.9	FC
15	3.5	13.5	15	BB	8.5	-	5.5	2	
16	2.6	9.27	9	BB	124	-	2.7	0.1	
17	4.9	8.18	6.81	BB	12	-	6.5	1.6	
18	15.3	91.9	6.13	BB	18	+	15.6	0.3	CLC
19	0.21	8.4	4.8	BB	28.5	-	0.9	0.7	
20	7.25	20.2	10.64	Bl	5.5	-	7.4	0.15	
21	16.5	176.9	11.8	BB	44.5	+	16.6	0.1	

BB – blue-black; Bl – blue; MT – mature teratoma; SC – serous cystadenoma; FC – follicular cyst; POC – paraovarian cyst; CLC – corpus luteal cyst

**Table 17.** Follow-up results of the conservative surgical treatment: dimensions, volume, and structure of ovaries in girls and women

No.	Age during ovarian torsion	Twisted ovary	Volume of the twisted ovary during the research (cm <sup>3</sup> )	Dimensions of the twisted ovary (cm)	Structure of the twisted ovary	Volume of the contralateral ovary (cm <sup>3</sup> )	Dimensions of the contralateral ovary (cm)	Structure of the contralateral ovary
1	17	R	11.04	4.29x2.73x1.8	M	13.2	3.8x3.35x1.98	M
2	26.9	R	15.7	3.47x2.77x3.48	M	17.53	3.47x2.77x3.48	M
3	25.3	L	10.65	3.49x3.46x1.62	PF	10.23	4.7x2.04x2.11	M
4	22	R	7.3	3.4x2.07x1.98	M	7.41	2.77x2.34x2.18	M
5	21.2	R	14.34	4.9x2.04x2.74	M	13.8	2.77x2.34x2.18	M
6	23	L	5.74	3.32x2.12x1.56	M	6.4	3.43x2.23x1.6	M
7	19.3	R	22.38	5x2.93x2.92	M	7.74	3.85x2.0x1.92	M
8	10.6	L	6.44	3.01x2.15x1.9	M	9.24	3.53x2.21x2.26	M
9	13.5	L	12.23	3.45x3.24x2.09	M	10.12	3.05x2.76x2.29	M
10	15.5	R	10.31	3.25x2.55x2.37	M	15.7	4.19x2.69x2.66	M
11	14	R	11.06	3.34x2.7x2.34	M	11.6	3.28x2.77x2.53	M
12	18.8	R	11.24	4.04x2.31x2.3	M	9.89	4.72x2.26x1.77	M
13	18.1	L	19.21	5.29x3.61x1.89	M	22.9	4.28x4.14x2.47	M
14	12.9	R	7.74	3.23x2.66x1.72	M	7.54	3.05x2.64x1.92	M
15	5.5	R	5.45	2.96x2.3x1.53	M	5.92	3.11x2.39x1.52	M
16	2.7	L	None			0.5	1.34x1.01x0.71	Mic
17	6.5	L	1.46	1.96x1.22x1.17	M	1.33	1.99x1.15x1.11	M
18	15.6	R	4.14	3.32x1.97x1.21	M	3.91	3.22x1.89x1.23	M
19	0.9	R	1.16	1.68x1.24x1.06	Mic	1.17	1.96x1.07x1.06	Mic
20	7.4	R	3.38	2.16x2.15x1.39	M	2.73	2.57x1.46x1.39	M
21	16.6	R	4.88	3.22x 1.88x1.54	M	5.17	3.76x 1.75x 1.5	M

M – multifollicular ovary; Mic – microfollicular ovary; PF – paucifollicular ovary; R – right ovary, L – left ovary

One 26.9 year old woman who after 48 hours of ovarian torsion underwent detorsion 11 years ago by leaving the blue ovary in the abdominal cavity, during the research had two children. One 23 year old woman who after 31 hours of ovarian torsion underwent detorsion 5.5 years ago by leaving the blue-black ovary in the abdominal

cavity during the research had one child. They had neither infertility treatment nor any difficulty in conceiving.

## CONCLUSIONS

1. As many as 54.7% of the causes of ovarian torsion were congenital anatomical. In the case of 45.3% of the patients ovarian torsion was caused by pathology. In patients before menarche there were statistically significantly more mature teratomas ( $p=0.03$ ).
2. No specific symptoms for ovarian torsion in children were identified. Prior to the surgery, ultrasonography showed that the twisted ovary was on average 21.48 (17.06) times larger than the healthy ovary. Leukocytosis and ovarian blood flow disorders were statistically significantly more common in girls with ovariectomy.
3. None of the girls who underwent detorsion with the ovary left in the abdominal cavity had thromboembolism or peritonitis; no malignant tumour was detected in any girl.
4. According to the histopathological findings, no necrosis was detected in 14 (82.35%) ovaries, therefore they could be saved.
5. Normal ovarian anatomy and folliculogenesis were retained in 95.24% of girls and women who were examined after detorsion.

## PUBLICATIONS

1. Geimanaitė L., Trainavičius K. Vaikų kiaušidžių užsisukimas. (*Ovarian torsion in children*). Medicinos teorija ir praktika 2012; 18(2): 243-246. ISSN 1392-1312.
2. Geimanaitė L., Trainavičius K. Vaikų kiaušidžių užsisukimas: atokieji gydymo rezultatai. (*Outcomes of ovarian torsion in children*) Medicinos teorija ir praktika 2012; 18(3): 317-320. ISSN 1392-1312.
3. Geimanaitė L., Trainavičius K., Čekuolis A. Sėkmingas kiaušidės išsaugojimas po ilgai užsitęsusio jos užsisukimo. (*Successful preservation of ovary after long term torsion*). Medicinos teorija ir praktika 2012; 18(3): 314-316. ISSN 1392-1312.



## Curriculum Vitae



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Name and address of employer	Children's Hospital, Affiliate of Vilnius University Hospital Santariskiu Klinikos, Santariskiu Str. 7, LT-08406, Vilnius, Lithuania
Dates	Since 2007
Occupation or position held	Children's Surgeon
Name and address of employer	Co LTD "SK Impeks Medicinos diagnostikos centras", V.Grybo str. 32/10, Vilnius, Lithuania
Dates	August 2009 – February 2010
Occupation or position held	Children's Surgeon
Name and address of employer	Co LTD "Baltijos ir Amerikos terapijos ir chirurgijos klinika", Nemencines road 54a, Vilnius, Lithuania
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Occupation or position held	Children's Surgeon
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Dates	Marth 2003 – July 2006
Occupation or position held	Assistant doctor
Name and address of employer	Children's Hospital, Santariskiu str. 7, Vilnius, Lithuania

## Education and training

Dates	Since 2008
Title of qualification awarded	PhD student
Name and type of organisation providing education and training	Vilnius University, Faculty of Medicine
Dates	2001-2006
Title of qualification awarded	Children's Surgeon
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Dates	2000-2001
Title of qualification awarded	Intern
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Dates	1994-2000
Title of qualification awarded	Medical doctor
Name and type of organisation providing education and training	Vilnius University, Faculty of Medicine

## Publications

1. Geimanaitė L., Trainavičius K. Vaikų kiaušidžių užsisukimas. (*Ovarian torsion in children*). Medicinos teorija ir praktika 2012; 18(2): 243-246. ISSN 1392-1312.
2. Geimanaitė L., Trainavičius K. Vaikų kiaušidžių užsisukimas: atokieji gydymo rezultatai. (*Outcomes of ovarian torsion in children*) Medicinos teorija ir praktika 2012; 18(3): 317-320. ISSN 1392-1312.
3. Geimanaitė L., Trainavičius K., Čekuolis A. Sėkmingas kiaušidės išsaugojimas po ilgai užsitęsusio jos užsisukimo. (*Successful preservation of ovary after long term torsion*). Medicinos teorija ir praktika 2012; 18(3): 314-316. ISSN 1392-1312.

## Presentations

4. Ovarian torsion. Geimanaitė L., Trainavičius K.. The 12<sup>th</sup> Conference of the Baltic Association of Paediatric Surgeons, Final programme and abstracts, 2012 May 17–19 Riga (Latvia).
5. 10-ies metų mergaičių kiaušidžių užsisukimo diagnostikos ir gydymo rezultatai VUVL. (*The results of diagnostic and treatment of ovarian torsion in girls in the past 10 years*) Geimanaitė L., Trainavičius K. Conference of Lithuanian Children's Surgeon's Association. 28 May 2010. (Lithuania).

## **SANTRAUKA**

### **Darbo tikslas**

Nustatyti ir įvertinti mergaičių kiaušidžių užsisukimo priežastis, optimalius diagnostikos kriterijus, chirurginio gydymo ir atokiuosius rezultatus bei sukurti praktines rekomendacijas gydytojams praktikams – vaikų chirurgams.

### **Darbo uždaviniai**

1. Įvertinti vaikų kiaušidžių užsisukimo priežastis.
2. Nustatyti klinikinių, laboratorinių ir echoskopinių tyrimų vertę vaikų kiaušidžių užsisukimo diagnostikai.
3. Įvertinti vaikų kiaušidžių užsisukimo chirurginės taktikos saugumą.
4. Įvertinti pašalintųjų kiaušidžių patologinės anatomijos ir histologijos tyrimus.
5. Išsiaiškinti vaikų kiaušidžių užsisukimo konservatyvaus chirurginio gydymo efektyvumą, remiantis atokiaisiais gydymo rezultatais.

### **Darbo naujumas**

Tai pirmasis mokslinis tyrimas Lietuvoje, analizuojantis vaikų kiaušidžių užsisukimo priežastis, optimalius diagnostikos kriterijus, chirurginio gydymo taktiką ir metodus bei atokiuosius rezultatus. Šis atokiųjų konservatyvaus chirurginio gydymo rezultatų tyrimas šiuo metu yra didžiausias pasaulyje. Publikacijų šia tema yra mažai, o Lietuvoje jų apskritai nėra.

### **Ginamieji disertacijos teiginiai**

Užsisukusią, padidėjusią, pakitusią (juodai mėlyną) kiaušidę atsukti ir palikti pilvo ertmėje saugu ir efektyvu, nes makroskopiškai negyvybingai atrodančios kiaušidės audinys ir folikulų formavimasis išlieka net ir po ilgo išemijos laikotarpio.

### **Tyrimo metodika**

Disertacija- atsitiktinės atrankos imčių palyginamasis biomedicininis tyrimas. Tyrimui gautas Vilniaus regioninio biomedicininio tyrimų etikos komiteto leidimas Nr. 158200-02-293-69. Tirti pacientai, kurie buvo operuoti dėl užsisukusios kiaušidės Vaikų

chirurgijos skyriuose nuo 1989 m. sausio 1 d. iki 2012 m. balandžio 1 d. Į tyrimą įtrauktos visos ligonės, kurios operuotos dėl kiaušidės užsisukimo, nepriklausomai nuo operacijos metodo ir kiaušidės užsisukimo priežasties. Tiriamųjų amžius – nuo naujagimystės iki 18 metų. Neįtrauktos tos ligonės, kurioms buvo užsisukęs kiaušintakis, rasta cista, navikas be kiaušidės užsisukimo ir jos kraujotakos sutrikdymo; taip pat pacientės, kurioms buvo įtartas kiaušidės užsisukimas, tačiau operacijos metu užsisukimo nerasta. Iš viso į tyrimą įtraukta 50 ligonių, operuotų dėl 53 kiaušidžių užsisukimo. 22 kiaušidės pašalintos, 31 – atsukta ir palikta pilvo ertmėje. Ligonės suskirstytos į dvi grupes: mergaičių, kurioms buvo pašalinta užsisukusi kiaušidė, ir mergaičių, kurioms kiaušidė buvo atsukta ir palikta pilvo ertmėje. Tyrimas suskirstytas į du etapus. Pirmame etape atlikta 40 ligonių retrospektyvi duomenų analizė (naudoti ligos istorijų ir ambulatorinių kortelių duomenys) ir 10 mergaičių prospektyvus tyrimas. Jos apklaustos pagal sudarytą anketą, po operacijos atlikti ultragarsiniai tyrimai su spalvine doplerometrija. Į antrą tyrimo etapą atrinktos tos pacientės, kurioms operacijos metu kiaušidė buvo atsukta ir palikta pilvo ertmėje, nepriklausomai nuo ligos trukmės ir kiaušidės išvaizdos operacijos metu. Į antrą tyrimo etapą neįtrauktos mergaitės, kurioms vėliau dėl navikų atsuktosios kiaušidės buvo pašalintos, ir tos, kurios turėjo vienintelę atsuktą kiaušidę. Iš viso antrame tyrimo etape tirta 21 pacientė. Jos buvo apklaustos pagal anketą, atliktas ultragarsinis kiaušidžių tyrimas su spalvine doplerometrija, vertinti abiejų kiaušidžių matmenys, tūris, struktūra, kraujotaka, dariniai. Sveikoji kiaušidė vertinta kaip kontrolinė.

Statistinė analizė atlikta programų SPSS 19.0 ir Statistica 6.0 paketais. Kiekybiniai kintamieji aprašyti kaip aritmetinis vidurkis su standartiniu nuokrypiu (SD). Tolydaus kintamojo ir kiekybinių kintamųjų skirstinio normalumas tikrintas Kolmogorovo ir Smirnov testu. Analizuojant duomenis, buvo skaičiuojamos aprašomosios statistikos, tikrinamos statistinės hipotezės apie skirtumus tarp vidurkių dažnumų bei požymių tarpusavio priklausomumą. Tikrinat statistines hipotezes, reikšmingumo lygmuo pasirinktas 0,05. Dviejų nepriklausomų grupių vidurkiams palyginti taikytas parametrinis Stjudento t ir neparametrinis Mano ir Vitnio testas, o dviem priklausomoms grupėms palyginti – parametrinis porinis t testas ir neparametrinis Vilkoksono metodas. Kokybinių požymių tarpusavio priklausomumui vertinti imtas chi kvadrato ( $\chi^2$ ) kriterijus. Priklausomai nuo imčių dydžio buvo taikytas tikslusis (mažoms

imtims) ir asimptominis  $\chi^2$  kriterijus. Prognozei taikytas binarinės logistinės regresinės analizės metodas. Ryšiui tarp požymių nustatyti buvo vertinami koreliacijos koeficientai.

### **Tyrimo rezultatai**

Nuo 1989 m. sausio 1d. iki 2012m. birželio 30d. į biomedicininį tyrimą įtraukta 50 mergaičių dėl 53 kiaušidžių užsisukimo: 22 (41,5%) kiaušidės pašalintos, 31 (58,5%) - atsuktos ir paliktos pilvo ertmėje. Mergaitės buvo nuo 2 mėnesių iki 17,9 metų amžiaus, vidutiniškai – 10,43(5,12) metų.

**Kiaušidės užsisukimo priežasčių įvertinimas.** Per visą tyrimo laikotarpį be patologinių darinių užsisuko 29 (54,72 %) kiaušidės. 24 (45,28 %) užsisukusiose kiaušidėse rasti patologiniai dariniai. Kiaušidės cista sudarė 62,5 % visų patologinių darinių užsisukusioje kiaušidėje, brandi teratoma – 25 % (11,32 % visų užsisukusių kiaušidžių), serozinė cistadenoma – 8,3 %. Nustatyta, kad ligonėms iki menarchės užsisukusioje kiaušidėje brandžių teratomų buvo statistiškai patikimai dažniau ( $p=0,0304$ ); o po menarchės brandžių teratomų nebuvo. Nė vienai mergeitei nebuvo diagnozuotas piktybinis užsisukusios kiaušidės navikas.

**Klinikinių, laboratorinių ir echoskopinių tyrimų įvertinimas.** Palyginus ligos simptomus pašalintųjų ir išsaugotųjų kiaušidžių grupėse, pastebėta, kad tarp pilvo skausmų pobūdžio ir lokalizacijos, vėmimo ir karščiavimo pobūdžio statistiškai reikšmingų skirtumų nebuvo. Lyginant leukocitų ir hemoglobino kiekį kraujyje tiriamose grupėse nustatyta, kad hemoglobino kiekis kraujyje reikšmingai nesiskyrė, tačiau leukocitų kiekis skyrėsi statistiškai reikšmingai. (Sjudento t testas:  $t=-2,075$ ;  $df=51$ ;  $p=0,043$ ). *Ultragarsinis tyrimas* iki operacijos atliktas 46 (86,79 %) ligonėms. Padidėjusi kiaušidė buvo rasta 45 (97,82 %) ligonėms, laisvas skystis pilvo ertmėje – 25 (54,34 %), daugybinės smulkios cistos – 24 (52,17 %), kraujotakos sutrikimai- 21 (45,65 %) ligonei. Kraujagyslinė kojytė ir “sūkurio” simptomas registruotas 6 (13,04 %) ligonėms. Išsaugotų ir pašalintų kiaušidžių grupėse statistiškai patikimai skyrėsi kraujotakos sutrikimo registravimas užsisukusioje kiaušidėje ( $p=0,007$ ), kitų ultragarsinių kiaušidės užsisukimo požymių reikšmingų skirtumų nenustatyta. Užsisukusios kiaušidės padidėjimui įvertinti nustatytas kiaušidės tūris ir padidėjimo kartai. 42 iš 46 (91,3 %) ultragarsinių tyrimų išmatuoti užsisukusios kiaušidės dydžiai, iš kurių paskaičiuotas tūris. Vidutinis užsisukusios kiaušidės tūris - 95,28 (74,52)  $\text{cm}^3$  (min

– 8,18 cm<sup>3</sup>, max – 381,49 cm<sup>3</sup>). Užsisukusios kiaušidės tūris koreliuoja su amžiumi (koreliacijos koeficientas  $r=0,681$ ). Nustatytas padidėjimo kartų kiekis = padidėjusios kiaušidės tūris/sveikos kiaušidės maksimalaus tūrio. Užsisukusi kiaušidė buvo padidėjusi vidutiniškai 21,48 (17,06) karto. Tiriant kiaušidės tūrį ir padidėjimo kartus pašalintų ir išsaugotų užsisukusių kiaušidžių grupėse, nustatyta, kad užsisukusios kiaušidės tūris šiose grupėse nesiskyrė, o padidėjimo kartai statistiškai reikšmingai skyrėsi. Todėl buvo taikyta regresinė binarinė logistinė analizė ir nustatyta, kad tūrio galimybių santykis nereikšmingas pacienčių grupėse, atmetus amžiaus įtaką (tūrio  $p=0,127$ , ŠS 1,011 95% PI 0,997-1,025; amžiaus  $p=0,093$ , ŠS 0,889 95% PI 0,775-1,020).

**Vaikų kiaušidės užsisukimo gydymo įvertinimas.** Nuo 1989 m. iki 2004 m. buvo operuotos 27 mergaitės dėl 30 kiaušidžių užsisukimo: 21 užsisukusi kiaušidė buvo pašalinta, 9 - atsuktos ir paliktos pilvo ertmėje, atsiradus kraujotakai kiaušidėje. Nuo 2005 m. iki 2012 m. – operuotos 23 mergaitės dėl 23 kiaušidžių užsisukimo: 22 ligonėms kiaušidės atsuktos ir paliktos pilvo ertmėje net nelaukiant, kol atsiras kraujotaka, vienai - pašalinta dėl brandžios teratomos. Iš 53 kiaušidžių 18 (34 %) buvo melsvos, atsukus jos atgavo kraujotaką ir buvo paliktos pilvo ertmėje. 35 (66 %) kiaušidžių išemija buvo ryški, jos buvo tamsiai mėlynos, juodai mėlynos spalvos, po atsukimo kraujotaka neatsirado arba atsistatė tik iš dalies. Lyginant makroskopinę išvaizdą išsaugotų ir pašalintų kiaušidžių grupėse statistiškai patikimo skirtumo nerasta ( $p=0,239$ ). Vidutiniškai kiaušidės užsisuko 2,26 (1,13) karto (min – 0,3; max – 5). Vidutinė užsisukimo (ligos) trukmė buvo 45,88 (60,77) valandos. Išsaugotų ir pašalintų kiaušidžių grupėse statistiškai reikšmingo užsisukimo kartų ir ligos trukmės skirtumo nenustatyta. Tiriant kiaušidės užsisukimą turėjusias mergaites, nerasta nė vieno trombembolijos, peritonito atvejo.

**Pašalintųjų kiaušidžių patologijos histologijos tyrimo įvertinimas.** Patologinės histologijos tyrimas atliktas visoms 22 ligonėms, kurioms kiaušidės pašalintos. Rastos 4 brandžios teratomos, 1 serozinė cistadenoma. Kitų 17 kiaušidžių patologinės histologijos tyrimo išvados buvo šios: 14 – oje (82,35%) kiaušidžių rastos kraujosrūvos ir folikulai, prisipildę skysčio ar kraujo, trijose pašalintose kiaušidėse rasta nekrozė (nekrozės plotelių), iš jų dviejose – kraujagyslių spindžiuose matomi trombai.

Palyginti mergaičių, kurių pašalintose kiaušidėse rasta nekrozė ( $n=3$ ) ir jos nerasta ( $n=14$ ), klinikiniai simptomai, diagnostikos požymiai, užsisukimo trukmė ir

kartai, makroskopinė kiaušidės išvaizda, tačiau statistiškai reikšmingo grupių skirtumo nenustatyta ( $p=0,344$ ).

**Atokiųjų konservatyvaus chirurginio gydymo rezultatų įvertinimas.** Atokieji rezultatai ištirti 21 (75% tirtų antrame etape) mergaitei ir moteriai. Tyrimo metu jos buvo vidutiniškai 14,91 (7,23) metų amžiaus. Jos tirtos praėjus vidutiniškai 4,09 (3,92) metų po operacijos (min – 0,1; max – 13,5). Nė vienai tiriamajai po konservatyvaus chirurginio kiaušidės užsisukimo gydymo nebuvo rastas kiaušidės navikas.

Visoms tiriamosioms buvo atliktas ultragarsinis kiaušidžių tyrimas. Atsuktos ir paliktos pilvo ertmėje kiaušidės tūris lygintas su sveikosios – statistiškai reikšmingo tūrių skirtumo nenustatyta.

Multifolikulinės kiaušidės su kraujotaka matytos 18 (85,72 %) mergaičių ir moterų, vienos (4,76 %) tiriamosios užsisukusi kiaušidė buvo paucifolikulinė (pavieniai folikulai), vienos (4,76 %) 10 mėnesių amžiaus mergaitės kiaušidės buvo mikrofolikulinės (atitinka šio amžiaus normą), vienai (4,76 %) mergaitei užsisukusios kiaušidės pamatyti echoskopu nepavyko. Geri konservatyvaus gydymo rezultatai – 20 (95,23 %) mergaičių ir moterų.

### Išvados

1. Kiaušidės užsisukimo 54,7 % priežasčių buvo įgimtos anominės; 45,3 % ligonių kiaušidė užsisuko dėl pataloginių darinių. Ligonėms iki menarchės statistiškai patikimai dažniau rasta brandžių teratomų ( $p=0,03$ ).
2. Specifinių vaikų kiaušidės užsisukimo simptomų nenustatyta. Iki operacijos, tiriant echoskopu, užsisukusi kiaušidė buvo didesnė nei sveikoji vidutiniškai 21,48 (17,06) karto. Leukocitozė ir kiaušidės kraujotakos sutrikimai statistiškai patikimai dažnesni mergaitėms, kurioms kiaušidė pašalinta.
3. Nė vienai mergaitei, kuriai kiaušidė buvo atsukta ir palikta pilvo ertmėje, nebuvo trombembolijos ir peritonito, nė vienai nerasta piktybinio naviko.
4. Trijose kiaušidėse (17,65 %) rasta nekrozės plotelių, 14-oje (82,35 %) pašalintų kiaušidžių nekrozės ir pataloginių darinių nebuvo, todėl jos galėjo būti išsaugotos.
5. Patikrintų 95,24 % mergaičių ir moterų atsuktos kiaušidės anatomija ir folikulogenezė išliko normali.



## Gyvenimo aprašymas



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Datos

2008.02 – 2008.09

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### Išsilavinimas

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Datos	2001-2006
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Datos	2000-2001
Kvalifikacija	Medicinos gydytoja (pirminė rezidentūra)
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Datos	1994-2000
Kvalifikacija	Gydytoja
Įstaigos, kurioje įgytas išsilavinimas, pavadinimas	Vilniaus universitetas, Medicinos fakultetas
Datos	1982-1994
Įstaigos, kurioje įgytas išsilavinimas, pavadinimas	Vilniaus 12-oji vidurinė mokykla
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