Evaluation of Mesh Placement in Adolescents Undergoing Inguinal Hernia Repair: A Multicenter Retrospective Cohort Study

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Background

- Inguinal hernia repair (IHR) varies between children and adults, with adults commonly undergoing mesh placement by laparoscopic or robotic approaches.
- There are few large or multicenter studies on mesh use and hernia recurrence in adolescents.
- Contemporary mesh use by pediatric general surgeons in adolescent inguinal hernia repair remains unclear.

Objectives

- The aims of this study were to evaluate mesh use and hernia recurrence in pediatric, adolescent-aged patients who underwent IHR and to compare the characteristics of those who did and did not have mesh placed.
- The primary outcomes were incidence of mesh placement and incidence of hernia recurrence.

Study Design

- This was a retrospective review at 20 children's hospitals in the United States of patients aged 12 to 17 years who underwent their first IHR by a pediatric general surgeon from 2017 to 2019. Patients had follow-up through the end of 2022 for a minimum 3-year follow-up.
- We calculated the incidence of mesh placement and recurrence and compared the characteristics of patients in the no-mesh and mesh groups.
- Data points included sex, age (years), weight (kg), BMI (kg/m^2), comorbidity[†], concomitant procedure, hernia incarceration, bilateral or unilateral repair, and open or laparoscopic repair.
- Comparison of groups was by Chi-square and Mann-Whitney U test with statistical significance set at $p<0.05$. SPSS (Version 29.0) was used for analysis.

Results

The cohort included 708 patients:

- 78.1% male
- Median age 15 years [IQR 13-16]
- Median BMI 20.6 kg/m^2 [IQR 18.2-23.4]
- 2.5% comorbidity
- 8.2% concomitant procedure
- 6.2% incarcerated hernia
- 90.8% unilateral repair
- 77.8% open repair

Primary outcomes:

- **7.8%** (55/708) underwent mesh placement.
- **1.3%** (9/708) had hernia recurrence.

Comparison of *No mesh* and *Mesh placement* groups:

- Sex, age, weight, and BMI were significantly associated with having undergone mesh placement.
- Of the 55 patients who had mesh placed, 47 (85%) underwent an open repair..
- Comorbidity, concomitant procedure, hernia incarceration, and surgical approach were not statistically different between the *no mesh* and *mesh placement* groups.
- All but one hernia recurrence occurred in the no-mesh group, though this did not reach statistical significance.

Variable	No mesh (n=653)		Mesh placement (n=55)		p-value	OR [95% CI]
	n	%	n	%		
Male	498	90.1	55	9.9	**<0.001**	1.11 [1.08-1.14]
Female	155	100.0	0	0.0		
Age (years)	14 [13-16]		16 [15-17]		**<0.001**	
Weight (kg)	56.0 [47.0-67.1]		72.9 [62.4-86.8]		**<0.001**	
BMI (kg/m^2)	20.3 [18.0-22.9]		23.5 [21.4-27.3]		**<0.001**	
Had major diagnosis	15	83.3	3	16.7	0.158*	2.45 [0.69-8.75]
No major diagnosis	638	92.5	52	7.5		
Concomitant procedure	53	91.4	5	8.6	0.797*	1.13 [0.43-2.96]
Hernia repair only	600	92.3	50	7.7		
Incarcerated	38	86.4	6	13.6	0.142*	1.98 [0.80-4.92]
Reducible	615	92.6	49	7.4		
Open repair	504	91.5	47	8.5	0.161	1.73 [0.80-3.73]
Laparoscopic repair	148	94.9	8	5.1		
Hernia recurrence	8	88.9	1	11.1	0.519*	1.49 [0.18-12.16]
No hernia recurrence	645	92.3	54	7.7		

Table 1. Comparison of characteristics of patients in the *no mesh* and *mesh placement* groups.

Discussion

- This study is somewhat limited by follow-up time. The older patients had a shorter follow-up time due to likely transitioning out of pediatric care and were lost to follow-up. This is an area of difficulty in research of adolescent aged patients, particularly those aged 17 years and under.
- There was an overall low event rate for mesh placement and hernia recurrence, which precluded additional analysis.
- We did not specifically study robotic approaches, but these inguinal hernia repairs would have been included under laparoscopic repairs.
- Less than 8% of adolescents who underwent inguinal hernia repair by pediatric general surgeons had mesh placed.
- Recurrence with minimum three-year follow-up was low at 1.3%, which may reflect that high ligation of the hernia sac without mesh placement is adequate in adolescents.

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[†] Comorbidities included omphalocele, pulmonary hypertension, congenital heart disease with repair, peritoneal dialysis catheter, connective tissue disorder, ventriculoperitoneal shunt, and tracheostomy.