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EFFECTS OF THE POLYETHYLENE-GLYCOL (PEG) COATED PADS ON INTESTINAL ANASTOMOSIS SAFETY: AN EXPERIMENTAL RAT MODEL

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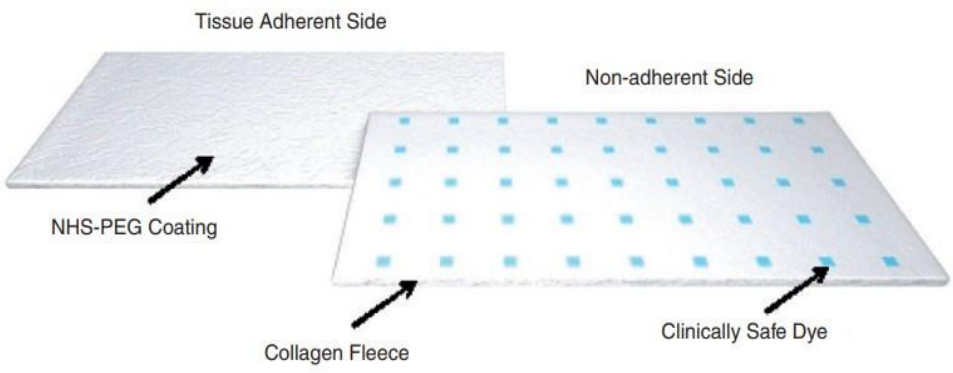
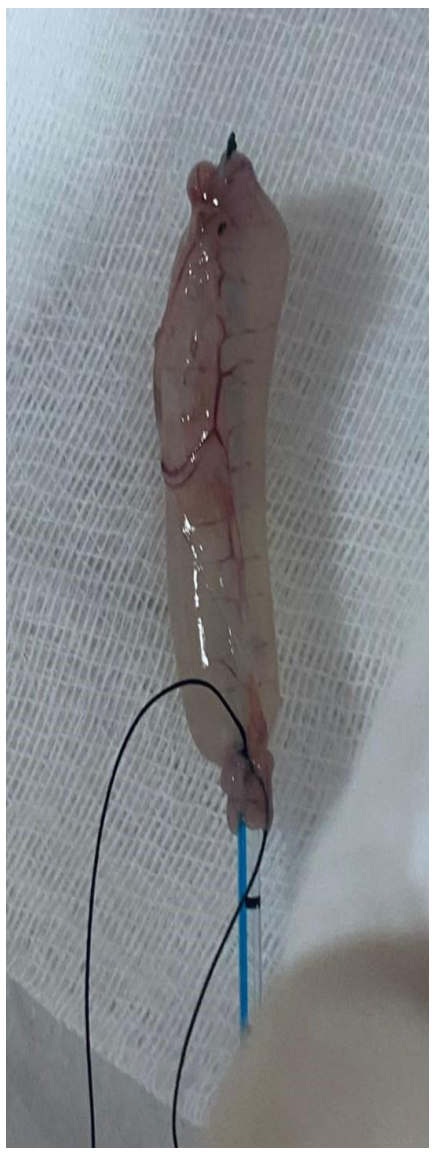
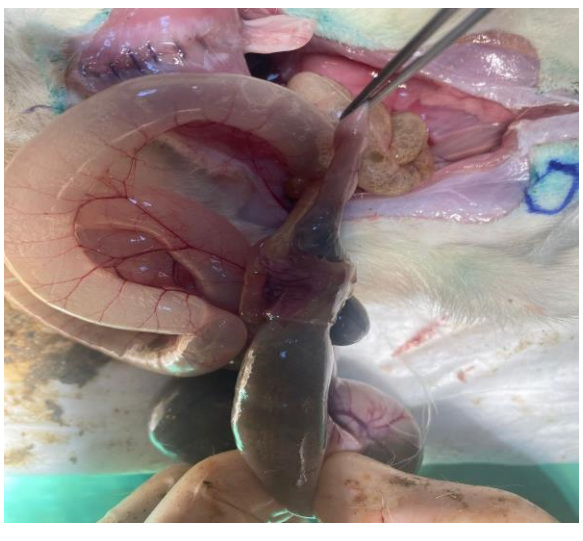
INTRODUCTION:

- Intestinal resection and anastomosis are commonly performed in children for various pathologies.
- Postoperative complications such as anastomotic stenosis, leakage, bleeding, wound infection, intra-abdominal abscess, and sepsis may occur.
- Collagen in the intestinal submucosa provides tensile strength at the anastomotic site, and its conversion to hydroxyproline enhances structural stability.
- The PEG-coated pad is a hemostatic and sealing material that effectively controls bleeding and prevents fluid or air leakage.
- The healing process of intestinal anastomosis resembles general wound healing, and inadequate primary healing is considered the leading cause of anastomotic leakage, reported in 1–24% of cases.







MATERIALS AND METHODS:
A: Anastomosis group (n=10)
AP: Anastomosis + PEG-coated pad applied group (n=10)
AI: Group naming intact bowel samples taken from anastomosis group (n=10)
API: Group naming intact bowel samples taken from anastomosis + PEG-coated pad applied group (n=10)

- After sample collection, rats were sacrificed by cervical dislocation under anesthesia.
- To assess bursting pressure, the resected intestinal segments were first measured.
- Histopathological evaluation was performed on sections stained with Hematoxylin-Eosin (HE), Masson's Trichrome (MT), Reticulin, and CD34, examined under a light microscope.
- Mucosal re-epithelialization, granulation tissue formation, muscle layer destruction, inflammatory infiltration, fibrosis, and angiogenesis were evaluated.
- Biochemical analysis included the measurement of tissue hydroxyproline levels.

RESULTS:

Comparison results of measurements according to groups

	A				AP				AI				API				*p.
	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range	Mean	SD	Median	Range	
Mucosal Anastomotic Reepithelialization	2,11a	1,05	2,00	3,00	2,67a	,71	3,00	2,00	1,22a	,83	1,00	3,00	2,00b	,87	2,00	2,00	***,018***
Granulation Tissue Formation	2,22a	,97	3,00	2,00	1,33b	1,22	1,00	3,00	,00c	,00	,00	,00	,00c	,00	,00	,00	***,001***
Muscle Tissue Destruction	1,67a	,50	2,00	1,00	1,67a	,50	2,00	1,00	,56b	,53	1,00	1,00	1,56a	,73	2,00	2,00	***,002***
Inflammatory Infiltration of the Anastomotic Wound	1,56a	,53	2,00	1,00	1,44a	,53	1,00	1,00	,22b	,44	,00	1,00	1,33a	,50	1,00	1,00	***,001***
Reticulin/Masson Trichrome - Fibrosis	1,33a	,71	1,00	2,00	1,78a	,67	2,00	2,00	,33b	,50	,00	1,00	1,67a	,87	2,00	3,00	***,002***
CD34 - Angiogenesis	1,67a	,50	2,00	1,00	1,67a	,50	2,00	1,00	,67b	,50	1,00	1,00	1,78a	,44	2,00	1,00	***,001***
Bursting Pressure	262,6a	100,5	280,0	314,0	55,8b	24,1	49,0	81,0	276,7	60,6	285,0	196,0	233,0	60,6	231,0	201,0	***,001***

** Intergroup significance level according to Kruskal-Wallis H test*

a,b,c: Shows the difference between groups according to the Bonferroni Post-Hoc test

SD: Standard Deviation

CONCLUSION:

- PEG-coated pads, although effective as hemostatic and sealing materials in dural repair, showed adverse effects on intestinal anastomosis healing in our study.
- Inflammatory changes observed in non-anastomotic intestinal tissues highlight the need for further research on their potential systemic effects.