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Title

Functional and Histologic Analysis of a Novel Elastic Biodegradable Patch for CDH Repair

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The data associated with this publication are not available for this reason: N/A

Introduction

- **CDH** is a congenital defect in the diaphragm causing herniation of abdominal contents and impaired lung growth
- **PTFE** is a synthetic polymer that is the current standard of care for patch repair of CDH
 - Limitations: stiff, not biodegradable, no growth with the child leading to re-herniation and repeated intervention¹
- **Polyurethane (PU)** is a novel material that is elastic, biodegradable, and biocompatible, allowing for optimized lung mechanics and tissue integration²

Objective

We aimed to compare, through histological analysis, the effectiveness of PU vs PTFE in repairing CDH.

Methods

- Sample of 18 rats:
 - 12 underwent a 4 mm diaphragmatic defect creation, followed by repair with PTFE (n=6) or PU (n=6)
 - 6 underwent sham laparotomy
- Euthanized at 4 weeks
- H&E staining performed on frozen 9 μ m thick sections

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Results

- No patch failures (recurrences) in either cohort
- PU had significantly thicker granulation tissue compared to PTFE (0.65 mm vs 0.36 mm, $p=0.004$)

Figure 1: Thickness of inflammatory capsule on the thoracic side of the patch in PTFE and PU

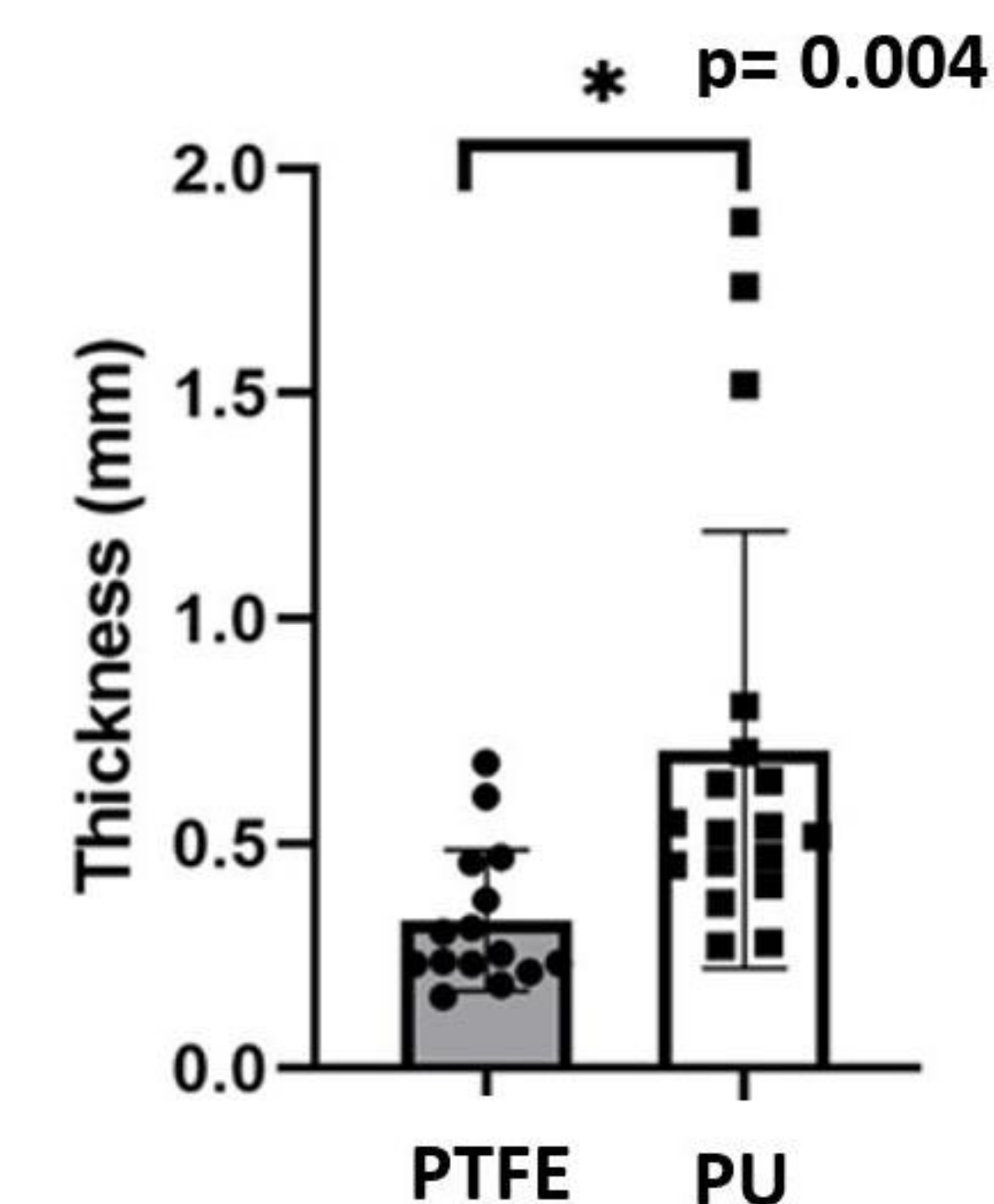
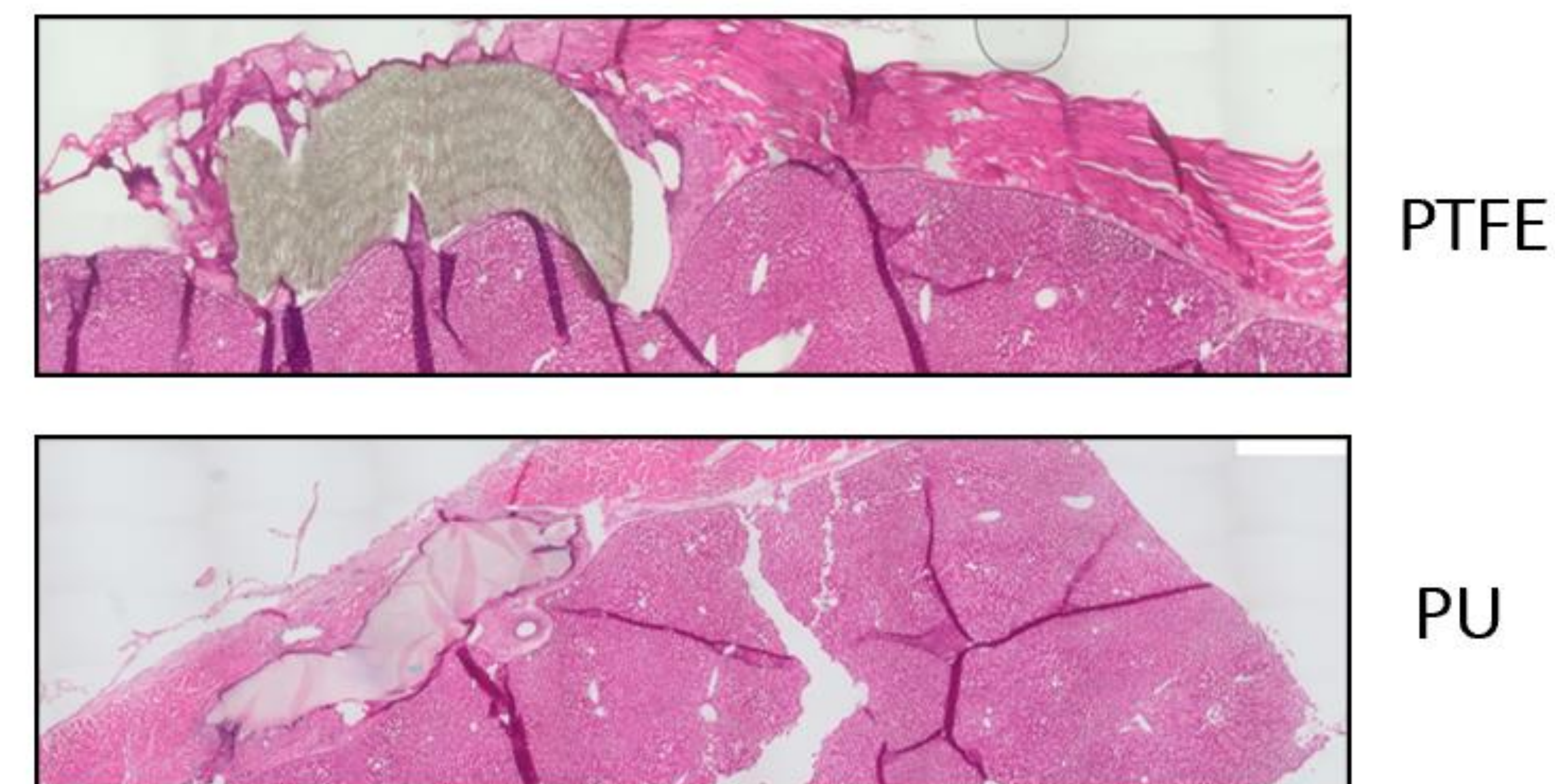


Figure 2: Results of H&E in PTFE and PU



Conclusion

Although PU caused more inflammatory capsule formation on the thoracic side compared to PTFE, there were no patch failures, demonstrating its potential as an alternative to PTFE.

Future Directions

- Experiments with larger sample size and longer follow up time
- Larger defect creation and repair
- Additional histological analysis to examine patch integration with native tissue
- Functional outcome studies

References

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