

Effectiveness of tissue adhesive for securing paediatric venous access devices: a systematic review and meta-analysis

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Introduction

- Vascular access devices are essential in paediatric care¹ but frequently fail (CVAD ~25%², PIVC ~34%³⁻⁵); or cause complications²⁻⁶.
- Tissue adhesive (TA) may reduce failure and complications⁷, yet its effectiveness in pediatrics remains unclear.

Aim

- Evaluate the effectiveness of TA in reducing vascular access device failure and complications in paediatrics.

Methods

- Systematic review and meta-analysis conducted per Cochrane⁸ and PRISMA⁹.
- **Search:** Nine databases + trial registries (2007–2024).
- **Inclusion:** RCTs in paediatric patients with CVADs or PIVCs secured with TA.
- **Process:** Dual independent screening & extraction; conflicts resolved by third.
- **Risk of bias:** RoB 2.0 tool¹⁰. **Certainty:** GRADE¹¹
- **Primary outcome:** Device failure, **Secondary:** Overall and specific complications
- **Analysis:** Common-effect model → pooled Risk Ratios (RRs) and Incidence Rate Ratios (IRRs).

Results

- 5 studies included a total of **1030 children's catheters**

Table 1 - Included studies

Author and year	Design	N	Hospital setting	Catheter type	Securement associated with TA	Securement associated with non-TA group	TA composition
Ullman et al 2017	Pilot-RCT	48	Pediatric hospitals (n=2)	Tunneled CVAD	• TA + Suture + BPU	• Suture, and BPU (<i>Standard care</i>); • Suture + SSD + BPU • Suture + ISD	Pure <i>n</i> -butyl
Kleidon et al., 2017	Pilot-RCT	101	2 Pediatric hospitals	PICC	• TA + BPU	• BPU + SSD (<i>Standard care</i>) • ISD	Pure <i>n</i> -butyl
Ullman et al 2019	Pilot-RCT	179	Pediatric Intensive Care Unit	Nontunneled CVAD	• TA + Suture + Griplik + BPU	• Suture + Griplik + BPU (<i>Standard care</i>) • Suture + Griplik + ISD	Pure <i>n</i> -butyl
Kleidon et al., 2020	Pilot-RCT	319	Medical and surgical wards	PIVC	• TA + BPU + NSF	• BPU + NSF (<i>Standard care</i>) • ISD + SF	Pure <i>n</i> -butyl
Charter et al., 2024	RCT	383 *	2 EDs of 2 hospitals	PIVC	• TA + ISD	• BPU (<i>Standard care</i>) • ISD	<i>n</i> -butyl + 2-octyl

Abbreviations: RCT: Randomized Controlled Trial; CVAD: Central Venous Access Device; PIVC: Peripheral Intravenous Catheter; PICC: Peripherally Inserted Central Catheter; CICC: Centrally Inserted Central Catheter. BPU: Bordered polyurethane dressing; SSD: Suture-less securement device; ISD: Integrated Securement Device; NSF: non-sterile foam; SF: sterile foam; TA: Tissue adhesive; ED: Emergency Department

* The study recruited 383 participants; however, the final analysis included only 363 patients

Rob 2.0: 80% low risk of bias¹²⁻¹⁵ 1 (20%) “some concerns”⁵. Blind not feasible

PIVC studies

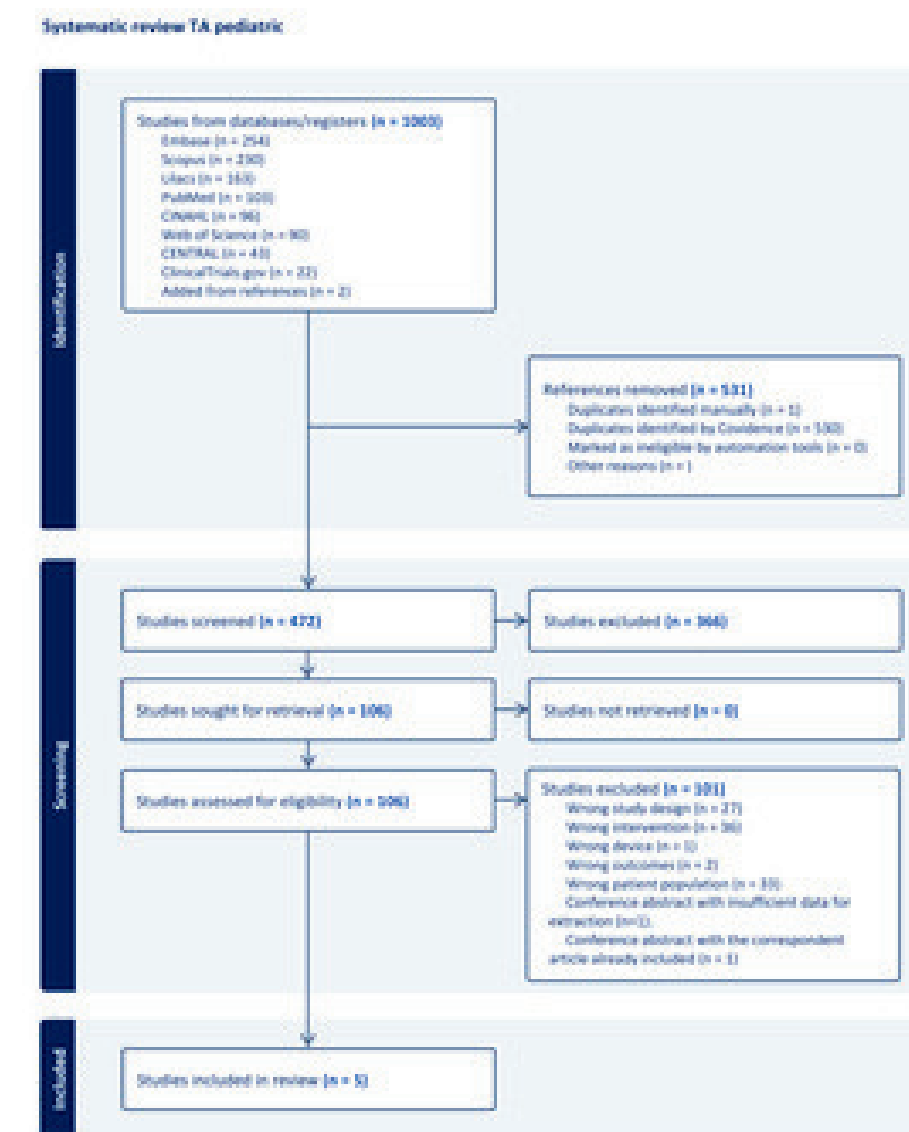
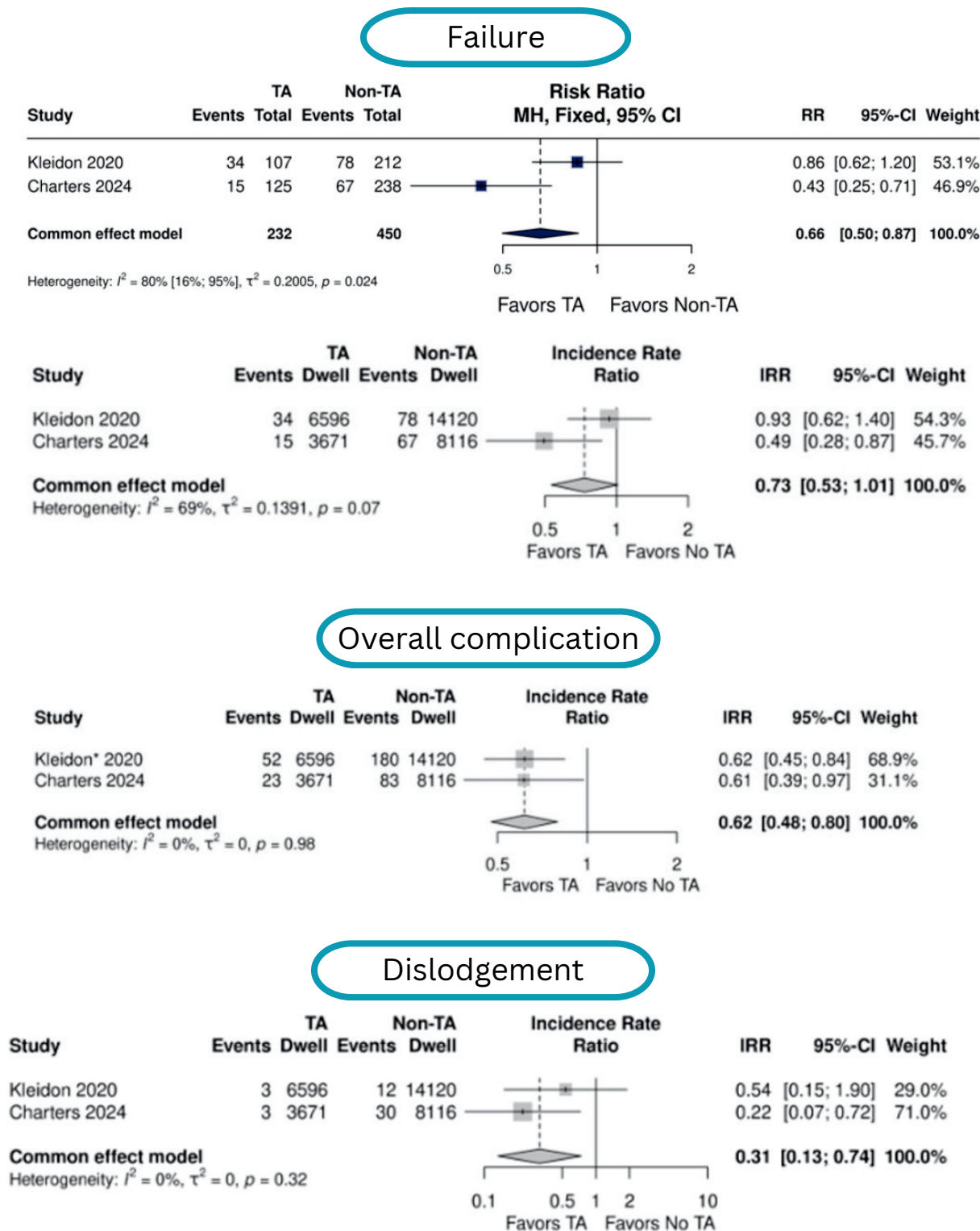


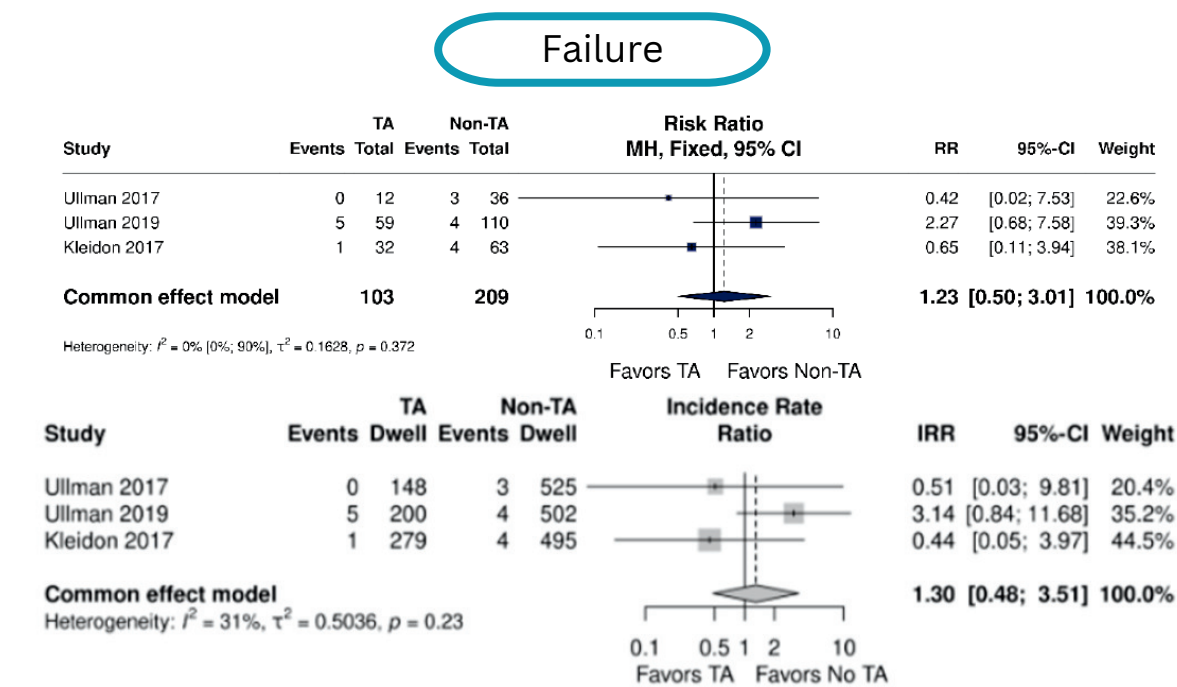
Fig 1 - PRISMA flow diagram extracted from Covidence



TA reduced failure (RR), overall complications (RR and IRR), and dislodgement (RR and IRR)(GRADE: very low–low).

- No association with occlusion, infiltration/extravasation, phlebitis, or skin injury.
- Meta-analysis not feasible for infection, haemostasis, or dressing life.

CVAD studies



- No association between TA and failure, overall complications, dislodgement, CLABSI, occlusion, breakage, or skin injury (low heterogeneity; low certainty).
- Meta-analysis not feasible for haemostasis and dressing life.

Conclusion

TA shows promise in reducing PIVC failure, complications, and dislodgement in children, but no benefit was found for CVADs. Evidence remains limited and of low–very low certainty (GRADE), requiring cautious interpretation. Future well-powered RCTs with standardized methods are needed, alongside TA formulations, and implementation strategies to support adoption.

References

[illegible]