

Efficacy of Accelerated Seldinger Technique in Long Peripheral Catheters for Difficult Intravenous Access: A Systematic Review and Meta-Analysis

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Introduction

- A **novel type of catheter** known as the **long peripheral catheter** (LPC) using the **accelerated Seldinger technique (AST)** has emerged in recent years, bridging the gap between short peripheral catheters and midline catheters (MC).¹
- When using the AST the introducer needle, guidewire, dilator, and catheter are combined into a single device.¹
- AST-LPC have led to **challenges in clinical practice, clinical trials, guidelines and evidence-based recommendations** e.g. regarding the expected dwell time. ^{2,3,4}
- The aim of this systematic review was to **comprehensively evaluate** the **catheter-related outcomes** associated with the utilization of AST for LPC insertion in **adult** patients encountering **difficult intravenous access** (DIVA).

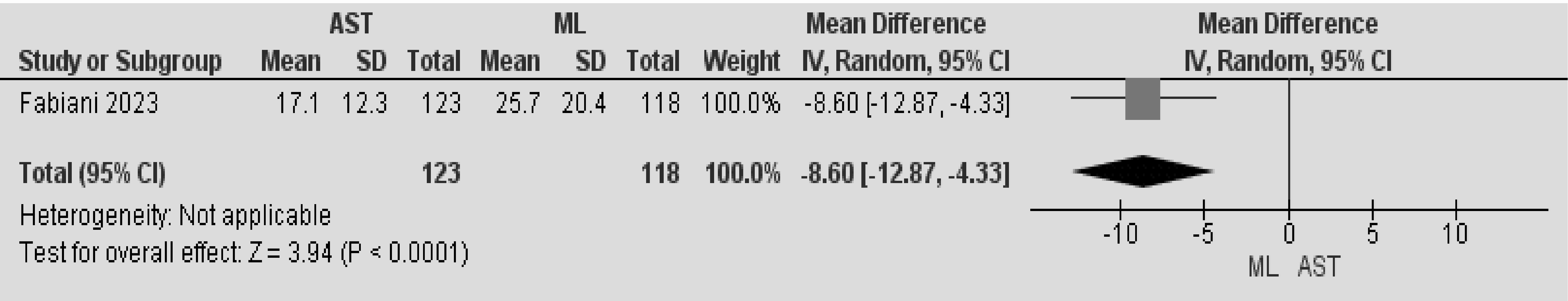
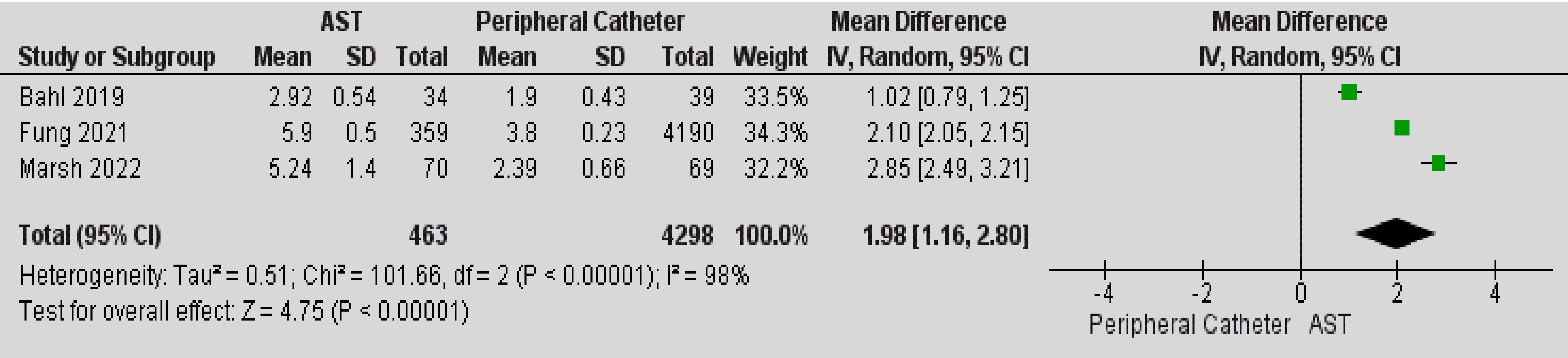
(1)Pittiruti et al. (2021), (2)Qin et al. (2019), (3)Owen (2014), (4) Spiegel et al. (2020)

Methods

- Quantitative studies from **CINAHL, Cochrane Library, Google Scholar, and PubMed** (2000–2023), focusing on **adult DIVA patients** requiring **AST-LPCs**.
- This review was prospectively registered in PROSPERO (CRD42023425513) on 24th of august 2023
- **PRISMA** guidelines and use of the **Quality Assessment Tool for Quantitative Studies** ensured rigorous evaluation.

Results

- **A total of 1017 studies were screened of which eleven were** included in the review.
- Mean **dwell time**: 2,92 (±0,54) to 17.1 (±12.3) days.
- **Significant mean dwell time difference of 1,98 days in favor of LPCs** over short peripheral catheters (p<0.00001).
- Reported complications included **catheter-related infections** (up to 10.2%), **thrombosis** (up to 15.4%), **infiltration** (up to 5%), **occlusion** (up to 10.2%), **phlebitis** (up to 9.8%) and **dysfunction** (3.6%-15.7%).



Conclusion

- This review underscores the **inconsistency in terminology** for catheters measuring 6-15 cm in length and the **reported outcomes**.
- AST-LPCs exhibit **greater durability** compared to short peripheral catheters.
- While **MC may surpass AST-LPC**, particularly for therapies exceeding four weeks, they entail **higher costs and procedural complexities**.
- This review underscores the **need for further high-quality randomized studies** comparing AST-LPCs, MCs and newer catheter-over-needle LPCs.