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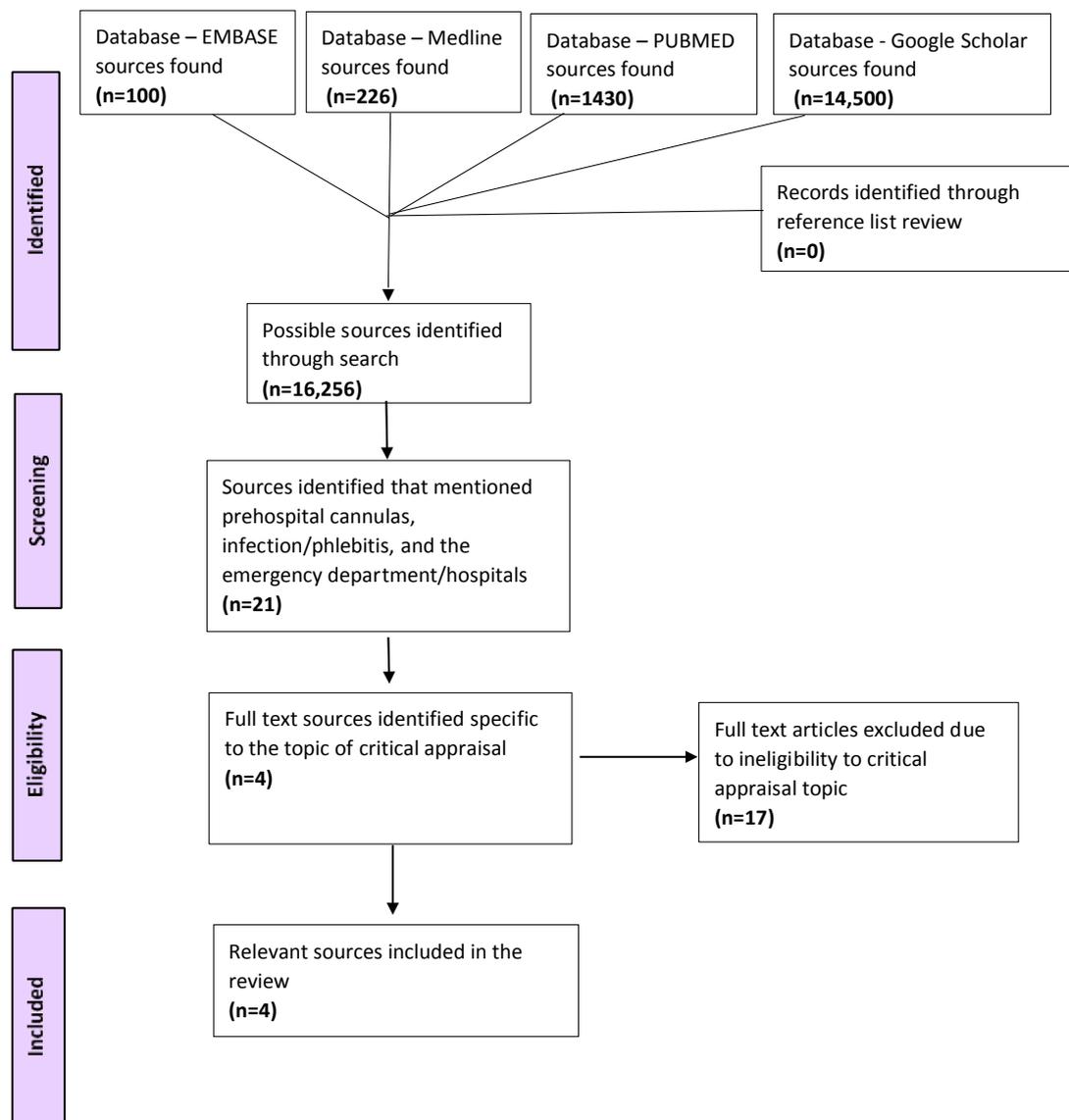
Paramedics insert ‘dirty’ IVs

PICO – (Population – Intervention – Comparison – Outcome)

Do the PIVCs (Peripheral Intravenous Cannula) which are inserted by paramedics in the field have more phlebitis rates and infections than those inserted within a hospital Emergency Department (ED)? And is it necessary for immediate removal?

Search Strategy

A search of the Medline, Pubmed, Embase and Google Scholar databases occurred on the 21st September 2021. The following search strategies were used: (infection OR phlebitis) AND rates AND intravenous AND access AND (prehospital OR paramedic OR EMT) AND (emergency AND department OR hospital), (iv OR cannula) AND (infection OR phlebitis) AND (prehospital OR paramedic) AND (emergency AND department OR hospital), (prehospital Or paramedic OR EMT OR emergency service) AND (infection OR phlebitis OR complication) AND (intravenous OR cannula) AND comparison, and Infection rates in prehospital cannulas compared to hospital. No year limit was set, and results were limited to English language, human studies as well as full articles being available.



Relevance and rationale of the question

The insertion of PIVCs is a common intervention in today’s prehospital medical practice. However, they are often immediately removed as per hospital guidelines due to the common assumption that asepsis cannot be maintained within the prehospital setting. It is believed that prehospital inserted PIVCs are ‘dirty’ and are at higher risk of infection or phlebitis, which ultimately could cause further complications if left in situ. As this may not be the case, it is important that this PICO question is reviewed for further clarification of these assumptions.

Relevant Articles

Author(s) and year	Study Design And LOE	Population size and characteristics	Aim of Study	Results found	Strengths and Weaknesses
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<p>(Clemen et al., 2012)</p>	<p>Descriptive, archival, retrospective study.</p> <p>LOE - 2b</p>	<p>- 345 trauma patients (over 17 years of age with an average age of 45.71 years).</p>	<p>- To determine how soon prehospital PIVCs were removed in trauma patients after hospital admission.</p> <p>- To determinate the rate of how often PIVC complications were present at the time of removal of PIVC when admitted to hospital.</p>	<p>- Out of the 345 patients, 110 (33.6%) had PIVCs removed within eight hours, and 229 (66.38%) had theirs removed within 24 hours.</p> <p>- 65 trauma patients who required surgery within 24 hours of hospital admission, only 4 prehospital inserted PIVCs (6.2%) were removed.</p> <p>- 2 patients (under 1%) who had PIVCs inserted in the prehospital setting displayed</p>	<p>Strengths –</p> <p>- This study provided further identification that infection and complication rates were low within the prehospital inserted PIVC cohort, thus adding to results that give a reason to review the current guidelines set out by many health facilities.</p> <p>Weaknesses –</p> <p>- The retrospective quality of this research relied heavily on the assumption that no</p>
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				<p>complications concerning the PIVC itself.</p>	<p>documentation of PIVC complications meant that none occurred.</p> <p>- Possible use of antibiotics at the time for the presenting conditions may have also reduced the incidence of possible complications.</p>
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(Ezingard et al., 2009)	Prospective descriptive study. LOE - 1b	- 147 patients (with a total of 149 PIVCs) Patients were all over the age of 18 years.	<ul style="list-style-type: none"> - To evaluate the levels of bacterial colonisation in PIVCs inserted by French emergency service teams in the prehospital setting. - To evaluate the bacterial colonisation of PIVCs dependent on the site of 	<ul style="list-style-type: none"> - 7 PIVCs (4.03%) were identified as positive during bacterial cultures identifying infection - Out of the 7 colonised PIVCs, the most common environmental site of intervention occurred either in the patient's home or by a public 	<p>Strengths – -</p> <ul style="list-style-type: none"> - This study is the first to evaluate the colonisation of PIVCs that were inserted by French emergency teams. - The study highlights that the environment in which emergency interventions are
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			intervention (environment).	<p>highway.</p> <ul style="list-style-type: none"> - There were variations in the quality of PIVC access along with variations of emergency conditions attended to. - Age was identified as an increased factor for the risk of colonisation. - Gauge of PIVC as a risk factor could not be assessed as a possible cause. 	<p>performed do not lead to increased colonisation of PIVCs.</p> <p>Weaknesses – -</p> <ul style="list-style-type: none"> - Absence of randomisation of PIVC replacement times limits further results, however, due to current recommendations, this is not possible. - The small sample size prevents other variables of significant risk factors of colonisation from being identified. - The removal of patients with difficult
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					intravenous access prevents results in a cohort that is an identified high-risk group of patients.
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<p>(Levine et al., 1995)</p>	<p>Retrospective analysis.</p> <p>LOE - 2b</p>	<p>3185 patients (859 prehospital PIVCs and 2326 in-hospital PIVCs).</p>	<p>- To evaluate whether prehospital inserted PIVCs led to clinically significant infections compared to PIVCs started in the hospital setting.</p>	<p>- Out of the 859 PIVCs inserted in the prehospital setting, one patient obtained and infected PIVC (equating to 1.2 per 1000 patients) in comparison to four patients with hospital placed PIVCs (equating to 1.7 per 1000 patients).</p> <p>- All infections noted had positive cultures and external signs and symptoms of infection present which was consistent with the CDC guidelines for</p>	<p>Strengths – - This study highlighted that the infection rates (0.12%) of prehospital inserted PIVCs were much lower than the literature described at the time.</p> <p>Weaknesses –</p> <p>- The retrospective nature of this study means that some infections may have remained undetected and that the methods of case surveillance may have attributed</p>
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				<p>infections and complications of clinical significance.</p>	<p>to this.</p> <p>- Follow up was not done on the patients who had prehospital PIVCs inserted and were then discharged from the hospital, thus leaving assumptions that this cohort did not experience delayed symptoms of infection.</p> <p>- Patients who had PIVCs inserted in the most emergent circumstances were excluded and due to the possibility of a break in asepsis and increased likelihood of compromised immune system</p>
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					ability. Although these patients may have been at the highest risk of infection, their PIVCs were not checked for infection.
(Zarate et al., 2008)	Prospective descriptive study. LOE - 1b	432 patients (Between the ages of 18 and 95 years with the average age of 47.12 years).	- To compare phlebitis rates between prehospital or ED inserted PIVC as well as effects of PIVC gauge, insertion site and trauma score (ISS)	- Overall phlebitis rates for all patients included in the study was 5.79%. - PIVCs started in the ED by RNs had a rate of 2.92% (n=137) compared to prehospital inserted cannulas by EMTs (n=115) with a rate of 6.09% and paramedics (n=180) at 7.78%. - All results were which were close to	Strengths – - Provided newer and helpful data surrounding phlebitis rates in trauma patients and their PIVCs. Weaknesses – - Small sample size for large gauge PIVCs could have altered results of Phlebitis caused by gauge. - Medications that may cause irritation
				the lowest rates reported in previous literature. - Insertion site, ISS and gauge did not create any statistical differences in phlebitis rates for either setting, however, due to the majority of smaller gauge PIVCs used, it is hard to determine appropriately if gauge increases risk.	effects at the PIVC site (rather than phlebitis) were not monitored. - No tip cultures of the PIVCs in both environments were collected upon removal to indicate infections that may potentially be the cause of phlebitis.

(Abbreviations: PIVC – Peripheral Intravenous Cannula, ED – Emergency Department, RN Registered Nurse)

Comments

Unfortunately, this review was difficult due to the research on this topic being quite dated. There was also very limited data on the topic, however, medicolegal problems and lack of testing may be the result of this (Garrett et al., 2017). Although this is the case, there were

no statistically relevant data indicating prehospital PIVCs being ‘dirty’, and results were comparable to the ED setting.

Considerations

Not enough testing is performed on prehospital inserted PIVCs to provide accurate results (e.g., tips sent off to pathology for testing) and follow up of post-removal of PIVCs from the prehospital setting was poor, so efficacious results are limited (especially as phlebitis often shows up post removal). Due to this, further testing is required to be able to effectively determine if prehospital PIVCs are actually ‘dirty’, even in a time when there is increased consideration of using as close to aseptic technique as possible within the nonclinical environment.

Further research could also be a beneficial precursor to a review of current hospital guidelines which could ultimately benefit the patient and health system (Clemen et al., 2012). These benefits range from the prevention of unnecessary pain for patients, reduced possibility of increased infection for patients through new PIVCs breaking the skin in other sites and a reduction in both cost and equipment wastage, especially if they are possibly based only on old assumptions (Garrett et al., 2017).

Clinical Conclusion

Prehospital inserted PIVCs may not necessarily be as ‘dirty’ as initially thought. With improvement in clinical considerations when considering the insertion of these devices, prehospital PIVCs appear to be just as clean as those inserted in the ED. With further data to support this, there could be a way forward for guideline reforms to benefit the patient.

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