

Peripheral Intravenous catheter management and

Reference (include title, author, journal title, year of publication, volume and issue, pages)	Evidence level (I-VII)	Key findings, outcomes or recommendations
Abolfotouh, M. A., Salam, M., Bani-Mustafa, A., White, D., & Balkhy, H. H. (2014). Prospective study of incidence and predictors of peripheral intravenous catheter-induced complications. <i>Therapeutics and clinical risk management</i> , (10) 993-1001.	IV	Changing catheters is recommended when clinically indicated rather than routinely post-72 hours.
Ben Abdelaziz, R., Hafsi, H., Hajji, H., Boudabous, H., Ben Chehida, A., Mrabet, A., . . . Tebib, N. (2017). Peripheral venous catheter complications in children: predisposing factors in a multicenter prospective cohort study. <i>BMC Pediatrics</i> , 17(1), 208-208. doi: 10.1186/s12887-017-0965-y	IV	The most frequent complications were infiltration and accidental removal. Recommendation of using infusion pumps to administer medications Removal of useless PIVCs to reduce the risk of PVC complications Improving PIVC protection using splints in smaller children and when devices are inserted in areas with high flexion should reduce infiltration and removal rates.
Callaghan, S., Copnell, B., & Johnston, L. (2002). Comparison of two methods of peripheral intravenous cannula securement in the pediatric setting. <i>Journal Of Infusion Nursing</i> , 25(4), 256-264.	III	Study compared the effect of two peripheral catheter dressings (a combination transparent polyurethane film/soft cloth surgical tape dressing, and adhesive tape) on the incidence of complications in children and adolescents. Catheter insertion site assessments at 24-hour intervals showed increased site visibility, better dressing adherence and less dressing reinforcement in the transparent dressing group.
Fidler, H. (2010). To splint or not to splint: securing the peripheral intravenous cannula. <i>Advances In Neonatal Care (Elsevier Science)</i> , 10(4), 204-205	II	This study exemplifies the need for additional randomized clinical trials that explore the appropriateness and usefulness of splints. The splint or no-splint study brings to light the possibility that current practices may not be having the intended results.
Gabriel, J. (2010). Vascular access devices: securement and dressings. <i>Nursing Standard (Royal College Of Nursing (Great Britain): 1987)</i> , 24(52), 41-46.	VII	Transparent, semi-permeable membrane (TSM) dressings allow easy assessment of the insertion site and surrounding area without the requirement to remove or disturb the dressing. If the dressing needs to be changed, the insertion site should be cleaned and allowed to dry before applying a sterile dressing.
Gunes, Aynur and Bramhagen, Ann-Cathrine (2018). Heparin or Sodium Chloride for Prolonging Peripheral Intravenous Catheter Use in Children - A Systematic Review. <i>Journal of pediatric nursing</i>	I	The systematic reviews showed no significant differences between heparin groups and sodium chloride groups regarding time in situ. Conclusion is that heparin might not be necessary but no guidelines are possible to develop.

Hadaway, L. (2009). I.V. rounds. Preventing and managing peripheral extravasation. <i>Nursing</i> , 39(10), 26-27	VII	Key management techniques in the event of extravasation. Careful adherence to proper procedures and timely identification of signs and symptoms are critical to avoiding potentially life-altering complications.
Hugill, K. (2016). Is there an optimal way of securing peripheral IV catheters in children? <i>British Journal of Nursing</i> , 25(19), S20-S21. doi: 10.12968/bjon.2016.25.19.S20	VII	Transparent film dressings has advantages in terms of site visualisation and protection of the surrounding skin from microbial contamination compared with tape and gauze. Adhesives used in dressings and tapes have been linked to tissue injury in children, including epidermal stripping, skin tears and dermatitis, particularly in those children born preterm
Inge J. J, A., Johanna A, H., Henriette T. M, W., Gert-Jan, v. d. W., Johannes M. M, G., & Kian D, L. (2011). Effectiveness of heparin solution versus normal saline in maintaining patency of intravenous locks in neonates: a double blind randomized controlled study. <i>Journal of Advanced Nursing</i> (12), 2677. doi: 10.1111/j.1365-2648.2011.05718.	II	This study was to evaluate the effect of heparin versus saline as flush solution for maintaining patency in peripheral intravenous locks in neonates As no difference in patency could be established, using saline as a flush solution is preferable to heparin in peripheral intravenous locks in neonates, given the greater likelihood of complications associated with heparin.
Keogh, S., Flynn, J., Marsh, N., Mihala, G., Davies, K., & Rickard, C. (2016). Varied flushing frequency and volume to prevent peripheral intravenous catheter failure: a pilot, factorial randomised controlled trial in adult medical-surgical hospital patients (Vol. 17).	II	This study reviewed the varying flushing frequency and volume to prevent peripheral intravenous catheter failure. Neither increased flushing volume nor frequency significantly altered the risk of PIVC failure.
Laudenbach, N., Carie A, B., Klaverkamp, L., & Hedman-Dennis, S. (2014). Peripheral IV Stabilization and the Rate of Complications in Children: An Exploratory Study. <i>Journal of Pediatric Nursing</i> , 29, 348-353. doi: 10.1016/j.pedn.2014.02.002	II	This study provides evidence that stabilization with a transparent dressing and tape and the commercially-available anchoring adhesive device may be equally effective in short-duration PIVs. Also a stabilization device may not be necessary in short-duration PIVs in children. Best practices for PIV insertion and maintenance appears to be frequent assessment, strictly aseptic insertion technique, and the use of an arm board splint, in children where uncontrolled movement is expected.
Lim, E. Y. P., Wong, C. Y. W., Kek, L. K., Suhairi, S. S. B. M., & Yip, W. K. (2018). Improving the Visibility of Intravenous (IV) Site in Pediatric Patients to Reduce IV Site Related Complications - An Evidence-based Utilization Project (Vol. 41, pp. E39-E45).	IV	Recommendation of using an adhesive transparent dressing for improved visibility and thereby lead to prevention and earlier detection of phlebitis and extravasation.

<p>Lucchini, A., Angelini, S., Losurdo, L., Giuffrida, A., Vanini, S., Elli, S., . . . Fumagalli, R. (2015). [The impact of closed system and 7 days intravascular administration set replacement on catheter related infections in a general intensive care unit: a before-after study]. Assistenza Infermieristica E Ricerca: AIR, 34(3), 125-133. doi: 10.1702/2038.22138</p>	VI	<p>A retrospective observational study on patients to evaluate the Blood stream infections and comparison of change of infusion lines every 96 hours and every 7 days. The replacement of infusion lines every 7 days in the study sample did not increase the BSI, helping to reduce the costs.</p>
<p>Malyon, Lorelle &amp; Ullman, et al. (2014). Peripheral intravenous catheter duration and failure in paediatric acute care: A prospective cohort study. Emergency Medicine Australasia. 26. 10.1111/1742-6723.12305.</p>	IV	<ul style="list-style-type: none"> <li>• A quarter of peripheral intravenous catheters (PIVCs) inserted in the paediatric emergency department failed due to infiltration, accidental dislodgement, blockage, phlebitis or other causes.</li> <li>• PIVC placement in the antecubital fossa, in comparison to the hand, was significantly associated with an increased risk for failure.</li> <li>• Redundant PIVC within paediatric acute care is of concern, with 53% of failed PIVC not requiring a new PIVC to be inserted.</li> </ul>
<p>Marsh, N., Webster, J., Mihala, G., &amp; Rickard, C. M. (2015). Devices and dressings to secure peripheral venous catheters to prevent complications.</p>	I	<p>It is not clear if any one dressing or securement device is better than any other in securing peripheral venous catheters. Skin damage (epidermal stripping, pressure injury) and mechanical phlebitis are related to securement or excessive movement of the catheter in the blood vessel.</p>
<p>Morris, W., &amp; Tay, M. (2008). Strategies for preventing peripheral intravenous cannula infection. British Journal Of Nursing, 17(19), S14-21.</p>	VII	<p>Elements of the cannulation procedure, dressing, and adequate documentation are the strategies identifying in preventing PIVC infections.</p>
<p>O'Grady N, Alexander M, Burns L, Dellinger E, Garland J, et al. (2011) The Healthcare Infection Control Practices Advisory Committee (HICPAC). Guidelines for the prevention of intravascular catheter-related infections. Clinical Journal of Infectious Diseases 2011 May;52(9): 1087–99.</p>	VII	<ul style="list-style-type: none"> <li>• Good hand hygiene before catheter insertion or maintenance, combined with proper aseptic technique during catheter manipulation, provides protection against infection.</li> <li>• Use of transparent, semipermeable polyurethane dressings have been recommended.</li> <li>• Replace catheter-site dressing if the dressing becomes damp, loosened, or visibly soiled</li> <li>• The risk for phlebitis in children has not increased with the duration of catheterization.</li> <li>• Leave peripheral venous catheters in place in children until IV therapy is completed, unless complications.</li> <li>• Minimize contamination risk by wiping the</li> <li>• Access port with an appropriate antiseptic and accessing the port only with sterile devices</li> </ul>

Phulara, U. (2018). Effectiveness of Normal Saline Flush versus Heparin Saline Flush in Maintaining the Patency of Peripheral Intravenous Cannula and on Occurrence of Intravenous Local Vascular Complications in Patients Receiving Intermittent Intravenous Medications, 51.	IV	Flushing of IV cannula is very effective and normal saline and heparin saline flush (10 unit) are equally effective in maintaining the patency of peripheral IV cannula and preventing the occurrence of local vascular complications.
Rickard, C. M., Marsh, N., Webster, J., Runnegar, N., Larsen, E., McGrail, M. R., . . . Playford, E. G. (2018). Dressings and securements for the prevention of peripheral intravenous catheter failure in adults (SAVE): a pragmatic, randomised controlled, superiority trial (Vol. 392, pp. 419-430).	II	Secure fixation can decrease the risk of complications, preserve veins, and reduce patient exposure to repeated venepuncture attempts. Current dressing and securement methods are commonly associated with PIVC failure and poor durability. Innovations to achieve effective, durable dressings and securements, and randomised controlled trials assessing their effectiveness are urgently needed.
Rickard, C. M., Webster, J., Wallis, M. C., Marsh, N., McGrail, M. R., French, V., . . . Whitby, M. (2012). Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial. <i>Lancet</i> , 380(9847), 1066-1074.	II	Results confirm that -clinically indicated peripheral intravenous catheter replacement is safe.
Rickard, C., McCann, D., Munnings, J., & McGrail, M. (2010). Routine resite of peripheral intravenous devices every 3 days did not reduce complications compared with clinically indicated resite: a randomised controlled trial. <i>BMC Medicine</i> , 853.	II	Clinically indicated resite would achieve savings in equipment, staff time and patient discomfort. There is growing evidence to support the extended use of peripheral IVDs with removal only on clinical indication.
Rickard, C. (2004). Prolonged use of intravenous administration sets: a randomised controlled trial.	III	Prolonged intravenous administration set use of 7 days was found to have no significant impact on patient infection indicators or physical performance of the sets
Rita, A., Hindra Irawan, S., & Pustika, A. (2013). Duration of peripheral intravenous catheter use and development of phlebitis. <i>Paediatrica Indonesiana</i> , Vol 53, Iss 2, Pp 117-20 (2013)(2), 117. doi: 10.14238/pi53.2.2013.117-20	IV	Observed no relationship between duration of peripheral intravenous catheter use and the development of phlebitis in our subjects.
Smith, B., & Royer, T. I. (2007). New standards for improving peripheral i.v. catheter securement. <i>Nursing</i> , 37(3), 72-74.	VII	Three types of products as acceptable for catheter stabilization. These include "manufactured catheter stabilization devices," sterile tapes, and surgical strips

<p>Tripathi, S., Kaushik, V., &amp; Singh, V. (2008). Peripheral IVs: Factors Affecting Complications and Patency-A Randomized Controlled Trial, 182.</p>	<p>II</p>	<p>This study is a randomized controlled trial covering all aspects associated with vascular access complications. Use of splints have significantly prolonged the life of the cannula and no associated increase in complications were identified due to usage of splints. Maximum glucose concentration for PIV infusions is generally 10% as more hypertonic solutions may produce local necrosis if extravasations occur.</p>
<p>Ullman AJ, Cooke ML, Gillies D, Marsh NM, Daud A, McGrail MR, O’Riordan E, Rickard CM. Optimal timing for intravascular administration set replacement. <i>Cochrane Database of Systematic Reviews</i> 2013, Issue 9.</p>	<p>I</p>	<p>The objective of this review was to identify any relationship between the frequency with which administration sets are replaced and rates of microbial colonization, infection and death. No evidence was found for differences in catheter-related or infusate-related bacteraemia or fungaemia with more frequent administration set replacement overall or at any time interval comparison. However evidence suggests that frequent administration set replacement is required in neonatal population.</p>
<p>Ullman, A., Marsh, N., &amp; Rickard, C. (2017). Securement for vascular access devices: looking to the future. <i>British Journal of Nursing</i>, 26(8), S24-S26. doi: 10.12968/bjon.2017.26.8.S24</p>	<p>VII</p>	<p>The authors recommends that 'One-size-fits-all' solutions for security and dressing are impractical and ineffective. Fundamental vascular access management practices need to be enhanced. The dressing and securement products used must be regularly assessed to ensure they are kept clean, dry and intact. The health of the skin surrounding the device must be maintained, and early signs of skin irritation or injury identified and effectively managed.</p>
<p>Webster, J. (2015). Clinically-indicated replacement versus routine replacement of peripheral venous catheters. <i>Cochrane Database of Systematic Reviews</i>(8).</p>	<p>V</p>	<p>The review found no evidence to support changing catheters every 72 to 96 hours. It is recommended that catheters are changed only if clinically indicated.</p>