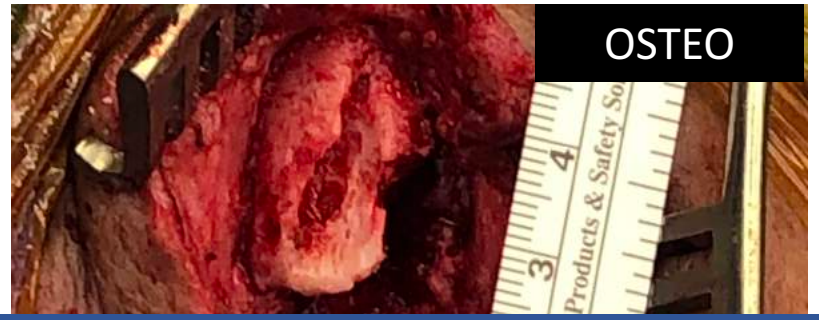
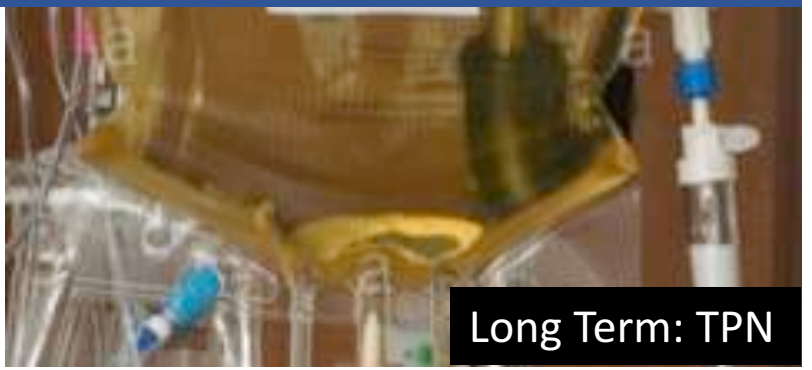

Dialysis


OSTEO


Critical Care

"The consequences of failure include the morbidity and mortality associated with the cause of the complication interruption of medical treatment and the insertion of replacement CVADs, involving the additional risk of procedural complications. Many CVAD complications are PREVENTABLE." Ullman et al.


Long Term Antibiotics


Long Term: TPN


COVID

Catheter securement: What is at stake?

How to Prevent and Treat Dislodgment

Catheter securement has been as much a challenge as catheter placement since venous and arterial access began.

A “one size fits all approach to CVAD securement is inappropriate and likely to be ineffective.” Broadhurst, Moureau, Ullman 2016

2016 Ullman et al. “25% of pediatric CVAD’s fail prior to treatment being complete.”

Fig. 1. — Early lamb blood transfusion

Journal of the Association for Vascular Access
Volume 23, Issue 4, December 2018, Pages 203-215

Original Article

Impact and Safety Associated with Accidental Dislodgement of Vascular Access Devices: A Survey of Professions, Settings, and Devices

Nancy Moureau RN, PhD, CRNI®, CPUI, VA-BC™

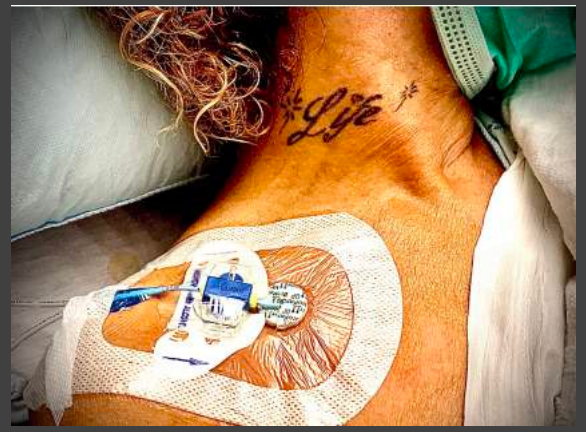
Dislodgement rates with intravenous catheters are reported at 1.8%-24% events per year resulting in failed access, interrupted treatment and greater resource consumption with catheter replacement.

Out of 1561 respondents 96.5% were from PIVC's, with the top three contributing factors: 90% confused, 74% patient removal, IV catheter tape or securement loose 65%,

95% of respondents consider IV dislodgement a safety risk to patients.

Conclusion: Global inconsistencies exist with use, application, and management of catheter securement and dressings for IV catheters.

Catheter Stabilization



Neonates

Original research article

JVA The Journal of Vascular Access

A retrospective analysis of the clinical effectiveness of subcutaneously tunneled femoral vein cannulations at the bedside: A low risk central venous access approach in the neonatal intensive care unit

Matthew Ostroff[1], Adel Zauk[2], Sara Chowdhury[2], Nancy Moureau[3] and Carly Mobley[2]

Impaired Skin Integrity

Tunneled central venous catheterization, a viable option for long-term venous access in pediatric burn patients

Clayton Wagner MS, Andrea Hess BS, Jose Olascoaga MS, Nicole Van Spronsen BS, John Griswold MD

Confusion/Dementia/Delirium

Alternative exit sites for central venous access: Back tunneling to the scapular region and distal tunneling to the patellar region

Matthew D Ostroff, Mauro Pittiruti

Pediatrics

Full Text | Scholarly Journals

Dislodgment rates and impact of securement methods for peripherally inserted central catheters (PICCs) in children

Frey, Anne Marie; Schears, Gregory.Pediatric Nursing; Pitman Vol. 27, Iss. 2, (Mar/Apr 2001): 185-9, 193.

Pediatric Nursing.

Central Venous Catheters in Home Infusion Care: Outcomes Analysis in 50,470 Patients

Nancy Moureau, BSN, CRNI [1] • Susan Poole, MS, CRNI, CNSN [1] • Margie A. Murdock, RN, MSN [1] • Sarah M. Gray, PhD • Charles P. Semba, MD [1] • Show footnotes

21% of Catheter Dysfunction is due to catheter **securement** almost twice that of infections.

We must agree that all patients are unique from their mental status to their skin integrity.

Ideal Securement
Provide Hold Strength
Block Bacteria from Entering the Wound
Have Antimicrobial Properties
Assist with Hemostasis
Be Comfortable for patients
Be Easy for Staff to use
Be Cost Effective

Frey and Schears in 2001 state, “Knowledge of reported rates of PICC dislodgment in children… is of the upmost importance when caring for children with PICC’s.”

Assessment

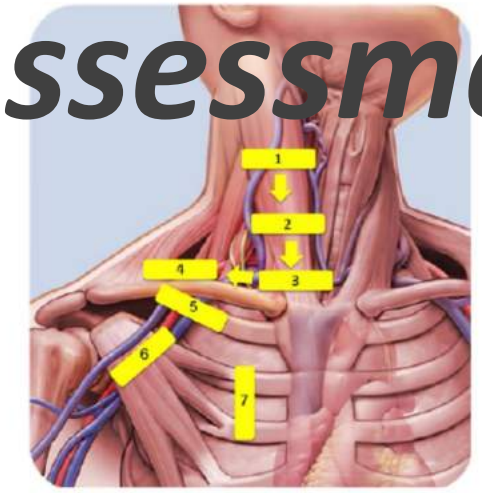


Figure 10. Overview of RaCeVA steps highlighting ultrasound transducer scanning points: courtesy of M.P./T.R.S.

*"A correct preliminary ultrasound evaluation of the patient's veins and the choice of the suitable vein are the fundamental requirements to guarantee a **stable** and long-lasting venous access." (Brescia, et al.)*

Prescribed Therapy	*Recommended Route*	*Ultrasound Assessment for Insertion Site Based on Available Vasculature*	*Device Selection*	*Assessment for Exit Site*	*Assessment for Proper Securement Device*

• 7 days
• <2 weeks
• >3 weeks
• Long Term
	• Peripheral
	• Central
		• RaPeVA
		  • PIV/MIDLINE
		• RaCeVA
		  • Tunneled/Non-Tunneled CVC
		• RaFeVA
		  • Tunneled/Non-Tunneled
			• PIV
			• MIDLINE
			• CVC
			• Tunneled
			• Implantable
				• RaExVA:
				• Rapid Assessment of Exit Site for Vascular Access Device
				  • Chest
				  • Arm
				  • Back
				  • Leg
				  • Abdomen
					Suture
					Sutureless
					TM
					SSM
					SCD
					Cyanoacrylate
					Securement dressing
					Tunneled with cuff
					implantable

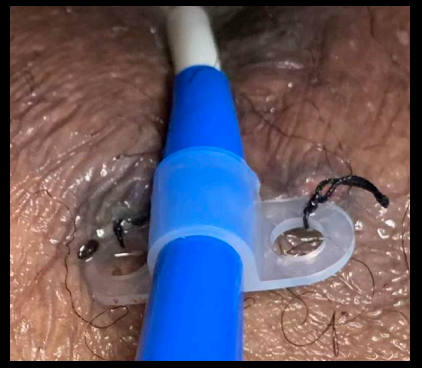
Non-Invasive Securement Methods

- 1. Convert to ORAL medication
- 2. Direct 1:1 Observation
- 3. Virtual Patient Observation
- 4. Patient and Family Education

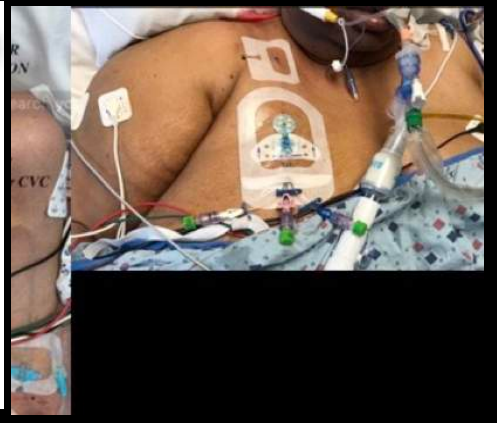
Stabilization Devices

1. Dressing Securement
2. Cutaneous Adhesive Securement
3. Joint Stabilization Boards
4. Sutures
5. Cyanoacrylate
6. Subcutaneous Securement
7. Catheter Incorporated: Cuffed
8. Wing Stabilization
9. Tunneling to Alternative Exit Site
10. Incorporated Stabilization and Extension Tubing





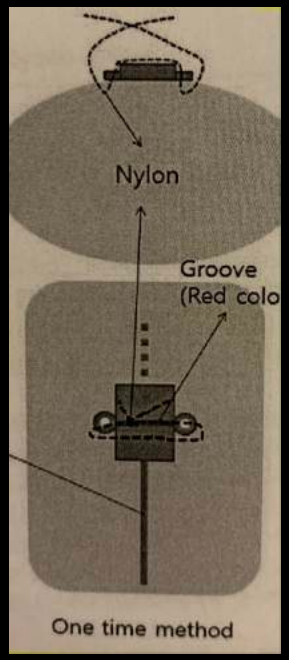

> Am J Emerg Med. 2017 Jul;35(7):961-963. doi: 10.1016/j.ajem.2017.01.063. Epub 2017 Jan 28.

Usefulness of new method of central venous catheter securement using a continuous suture

Janghyuck Moon [1], Sung Uk Cho [2], Jin Woong Lee [1], Seung Ryu [1], Yong Chul Cho [1], Won Joon Jeong [1], Hong Joon Ahn [1], Ki Hyuk Joo [1]

COVID has decreased supplies resulting in kits without stabilization devices.

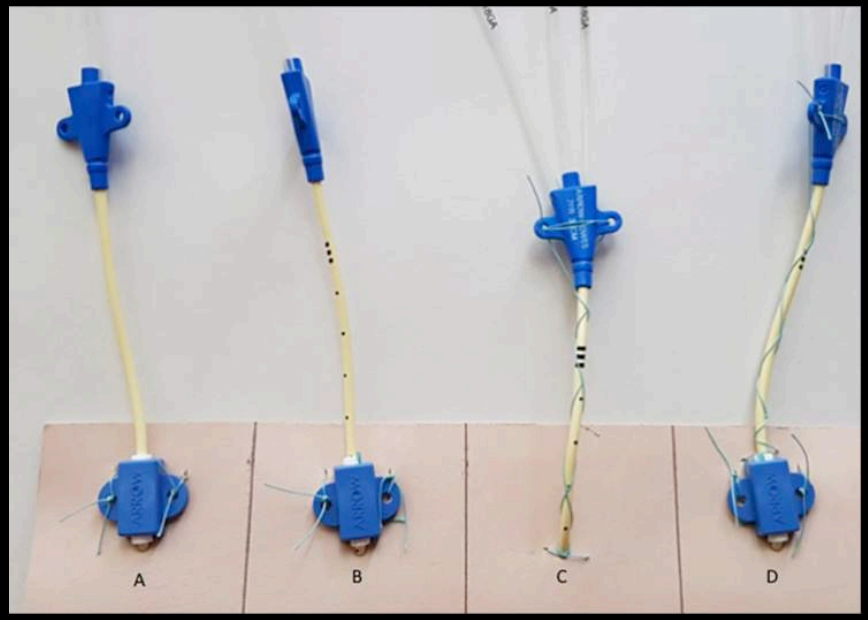
Suturing is thought to promote bacterial colonization at the catheter site. It is hypothesized that placing cyanoacrylate over the suture site will reduce this risk



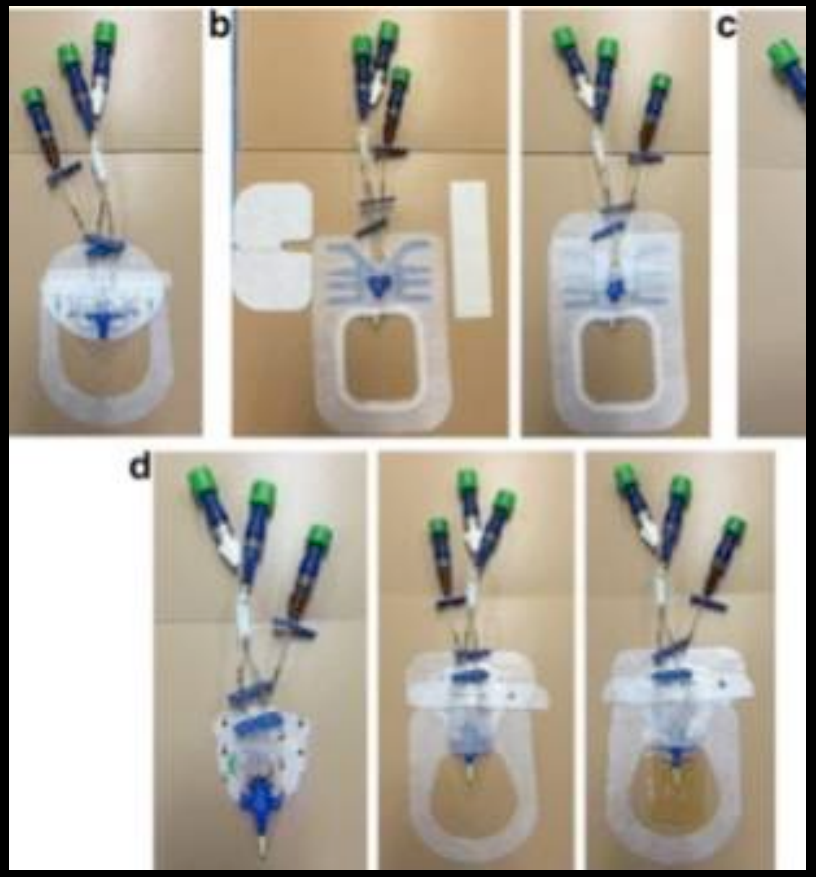
Comparative Study > PLoS One. 2019 Sep 12;14(9):e0222463.
doi: 10.1371/journal.pone.0222463. eCollection 2019.

Effectiveness of different central venous catheter fixation suture techniques: An in vitro crossover study

Manuel Florian Struck [1], Lars Friedrich [1], Stefan Schleifenbaum [2], Holger Kirsten [3], Wolfram Schummer [4], Bernd E Winkler [5]



Sutures



> Intensive Care Med Exp. 2015 Dec;3(1):60. doi: 10.1186/s40635-015-0060-3. Epub 2015 Aug 27.

Catheter securement systems: comparison of two investigational devices to a sutureless securement device, a securement dressing, and sutures in a pig model

Laura F Rutledge [1], Daniel P DeCabooter, Shelley-Ann H Walters, Stéphanie F Bernatchez

RESEARCH ARTICLE: SYSTEMATIC REVIEW AND META-ANALYSIS

Comparative efficacy of 13 antimicrobial dressings and different securement devices in reducing catheter-related bloodstream infections

A Bayesian network meta-analysis

Dang, Fang-Ping MD[a]; Li, Hui-Ju BD[a,*]; Tian, Jin-Hui PhD[a,b]

Section Editor(s): Singh., Sarman **Author Information**

Medicine: April 2019 - Volume 98 - Issue 14 - p e14940

Sutureless Securement Devices: Transparent Membrane Dressing Securement

Sutureless securement was brought in to eliminate risk of sharp injury from suturing as well as bacterial colonization from suturing.

Built In Stabilization

Robert E. Helm, MD
Jeffrey D. Klausner, MD, MPH
John D. Klemperer, MD
Lori M. Flint, BSN, RN, CCRN
Emily Huang, BA

Accepted but Unacceptable: Peripheral IV Catheter Failure

TABLE 2

The 5 Modes of Peripheral IV Catheter Failure: Prospective Randomized Controlled Studies 1990-2014[a]

Mode of Peripheral IV Catheter Failure	Range	Me	
Catheter-related phlebitis	0.1%-63.3%	15.4%	9.0%
Catheter infiltration	15.7%-33.8%	23.9%	22.2%
Catheter occlusion/mechanical failure	2.5%-32.7%	18.8%	22.8%
Catheter dislodgment	3.7%-9.9%	6.9%	7.0%
Catheter-related infection	0.0%-0.44%	0.2%	0.2%

Finally, “Meaningful change will require that the concept of the peripheral IV catheter as an expendable and replaceable tool be discarded.

Strategy: attaching extension tubing to the catheter hub, so that the interaction point is remote from the actual catheter and its insertion site.

Ultrasound-guided placement of peripherally inserted intravenous catheters increase catheter dwell time in children

James Thomas Cottrell [1], Todd Chang [2], Jennifer Baird [1], Joanna Barreras [1], Marsha A Elkhunovich [2]

J Vasc Access. 2020 Jun 12;1129729820927238. doi: 10.1177/1129729820927238.
Online ahead of print.

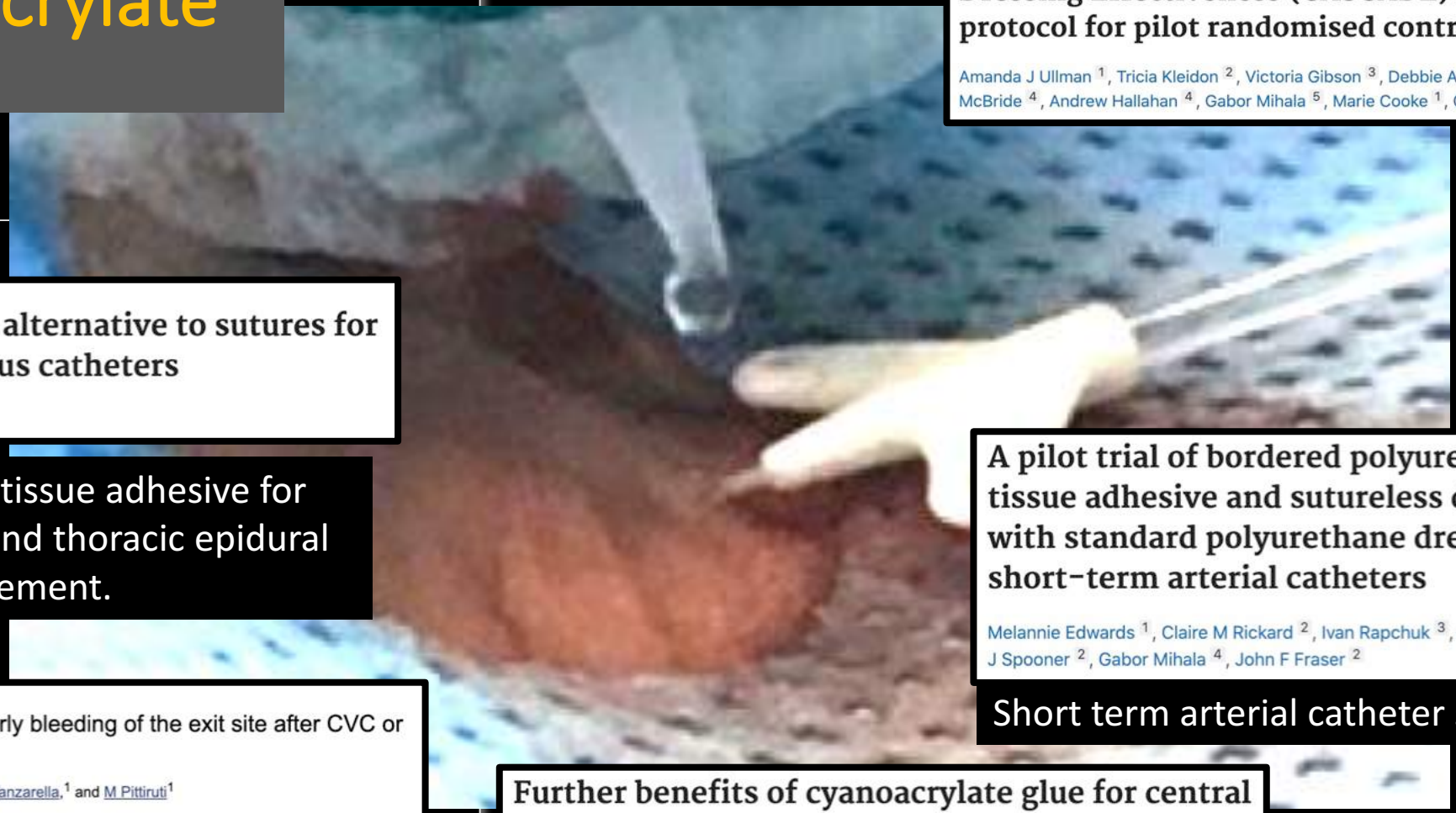
Effectiveness of transparent film dressing for peripheral intravenous catheter

Selma Atay [1], Fatma Yilmaz Kurt [1]

Securement	Rationale
Entry Site Integrity	Open Wound
Exit Site Location	Ultrasound
Cutaneous Securement	Stabilization
Cyanoacrylate	Seal Wound/Stabilization
Transparent Film Dressing	Protect Site/Stabilization

2011 INS standards reads, “the use of catheter stabilization device should be considered the preferred alternative to tape or sutures when feasible.

Cyanoacrylate



Central venous Access device SeCurement And Dressing Effectiveness (CASCADE) in paediatrics: protocol for pilot randomised controlled trials

Amanda J Ullman [1], Tricia Kleidon [2], Victoria Gibson [3], Debbie A Long [2], Tara Williams [3], Craig A McBride [4], Andrew Hallahan [4], Gabor Mihala [5], Marie Cooke [1], Claire M Rickard [1]

Tissue adhesive as an alternative to sutures for securing central venous catheters

P R Smith, R Wyatt

Successful use of tissue adhesive for epidural catheter and thoracic epidural securement.

A pilot trial of bordered polyurethane dressings, tissue adhesive and sutureless devices compared with standard polyurethane dressings for securing short-term arterial catheters

Melannie Edwards [1], Claire M Rickard [2], Ivan Rapchuk [3], Amanda Corley [2], Nicole Marsh [4], Amy J Spooner [2], Gabor Mihala [4], John F Fraser [2]

Short term arterial catheter securement.

Cyanoacrylate glue prevents early bleeding of the exit site after CVC or PICC placement

G Scoppettuolo,[1] MG Annetta,[1] C Marano,[1] E Tanzarella,[1] and M Pittiruti[1]

PICC, Dialysis and CVC lines to reduce site bleeding, entrance of bacteria and increasing catheter stability.,

Further benefits of cyanoacrylate glue for central venous catheterisation

G Scoppettuolo [1], L Dolcetti [2], A Emoli [2], A La Greca [2], D G Biasucci [2], M Pittiruti [2]

Reduced site bleeding from 40% to 0%, eliminating early dressing changes.

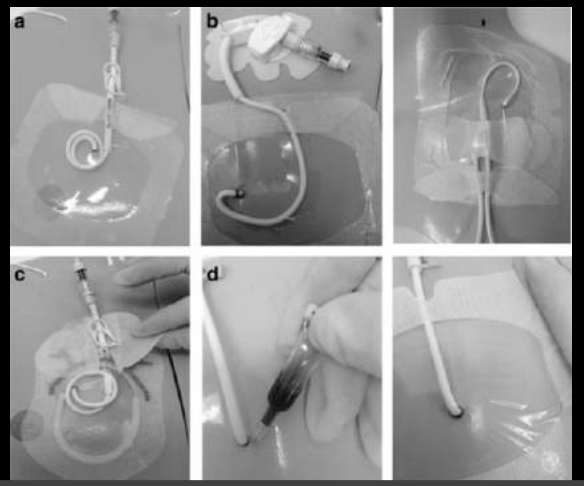
Built in Central Catheter Securement

Clinical Trial > BMC Cancer. 2017 Aug 30;17(1):595. doi: 10.1186/s12885-017-3606-9.

Innovative dressing and securement of tunneled central venous access devices in pediatrics: a pilot randomized controlled trial

Amanda J Ullman [1 2], Tricia Kleidon [3 4], Victoria Gibson [3 4], Craig A McBride [3 5 6], Gabor Mihala [3 6 7], Marie Cooke [8 3], Claire M Rickard [8 3]

Sutures
Cyanoacrylate, Cutaneous
Stabilization Bordered dressings

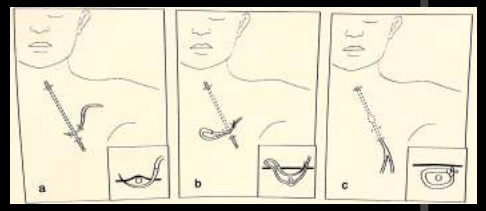


- Ullman et al. concludes, “Careful consideration should be given by interdisciplinary clinicians when choosing CVAD securement to ensure it is the most appropriate device for the individual needs of their patient.”

> Pediatr Surg Int. 2001 Mar;17(2-3):245-6. doi: 10.1007/s003830000502.

"Cuff-stitch" to prevent inadvertent dislodgement of central venous catheters

R Babu [1], R D Spicer



> Yeungnam Univ J Med. 2020 Jul;37(3):186-193. doi: 10.12701/yujm.2019.00465. Epub 2020 Mar 17.

Improvement of catheter-related outcomes after application of tunneled cuffed hemodialysis catheter insertion without fluoroscopy

Seok Hui Kang [1], Jun Young Do [1]

Compared replacing non tunneled temporary hemodialysis catheters with tunneled hemodialysis catheters at the bedside with improved outcomes and overall nurse satisfaction.

Cost effective:
1 device for length of therapy
Eliminating MARSI

Best results (zero dislodgments) from trained operatives.

This is the only securement that eliminates catheter migration and pistoning during a dressing change and that is where the true benefit exists in this device.

The ideal securement of a long term VAD is the application of SAS, sealing the insertion wound with cyanoacrylate, and reinforcing pull force with cutaneous adhesive securement to the catheter hub. Future studies should examine cutaneous securement of the catheter hub compared to securing the hub with a cyanoacrylate.

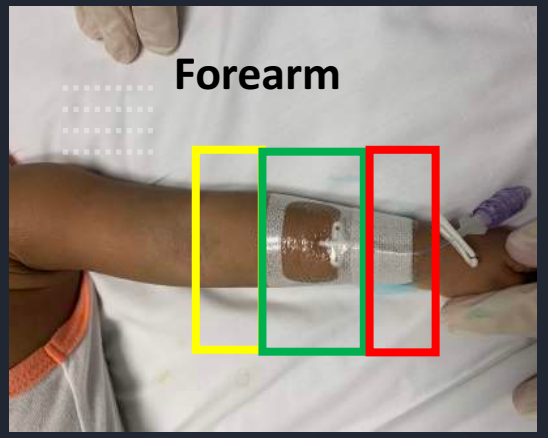
Avoid in non-cooperative patients and patients with cognitive disorders who have a very high risk of involuntary removal of the VAD – seek out alternate exit site location or totally implantable.

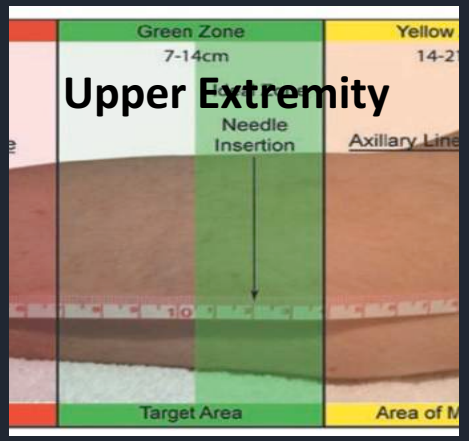
Subcutaneous Securement

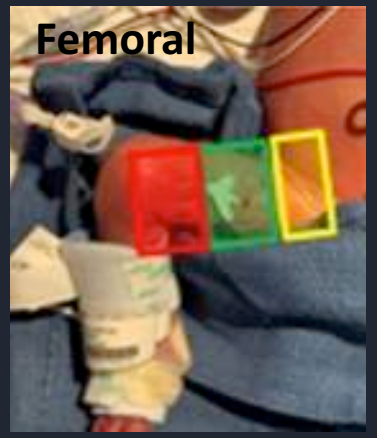
> J Vasc Access. 2020 Jul 2;1129729820924568. doi: 10.1177/1129729820924568.
Online ahead of print.

GAVeCeLT-WoCoVA Consensus on subcutaneously anchored securement devices for the securement of venous catheters: Current evidence and recommendations for future research

Fulvio Pinelli [1], Mauro Pittiruti [2], Ton Van Boxtel [3], Giovanni Barone [4], Roberto Biffi [5], Giuseppe Capozzoli [6], Alessandro Crocoli [7], Stefano Elli [8], Daniele Elisei [9], Adam Fabiani [10], Cristina Garrino [11], Ugo Graziano [12], Luca Montagnani [13], Alessio Pini Prato [14], Giancarlo Scoppettuolo [15], Nicola Zadra [16], Clelia Zanaboni [17], Pietro Zerla [18], Evangelos Konstantinou [19], Matt Jones [20], Hervé Rosay [21], Liz Simcock [22], Marguerite Stas [23], Gilda Pepe [15]







Alternate Exit Site Locations

> Korean J Anesthesiol. 2020 Jul 16. doi: 10.4097/kja.20131. Online ahead of print.

Prevention of epidural catheter migration: A comparative evaluation of two tunneling techniques

Sujeet Gautam [1], Anil Agarwal [2], Pravin Kumar Das [3], Sandeep Khuba [4], Sanjay Kumar [5]

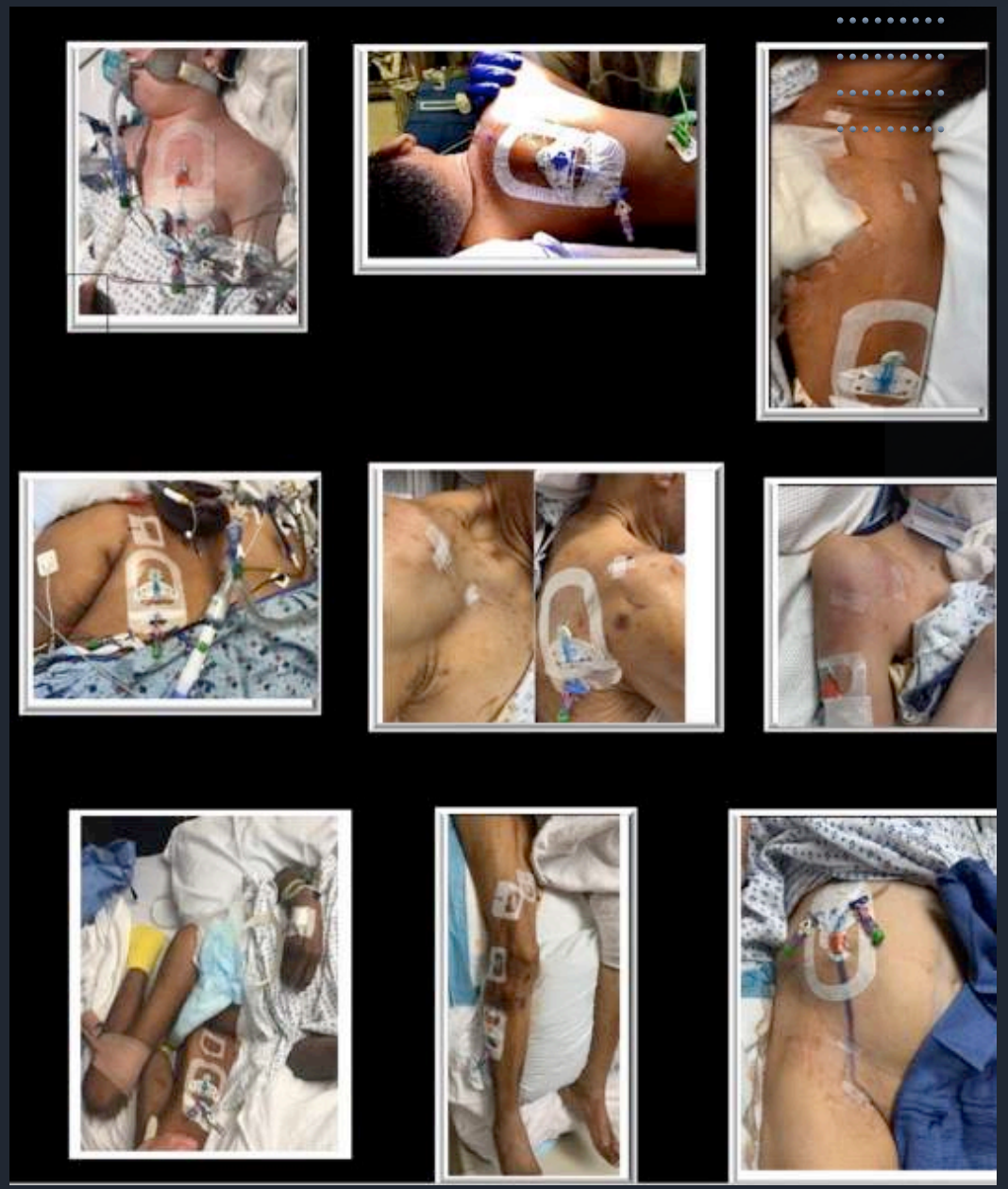
Clinical Trial > Clin Nutr. 2000 Aug;19(4):237-43. doi: 10.1054/clnu.2000.0103.

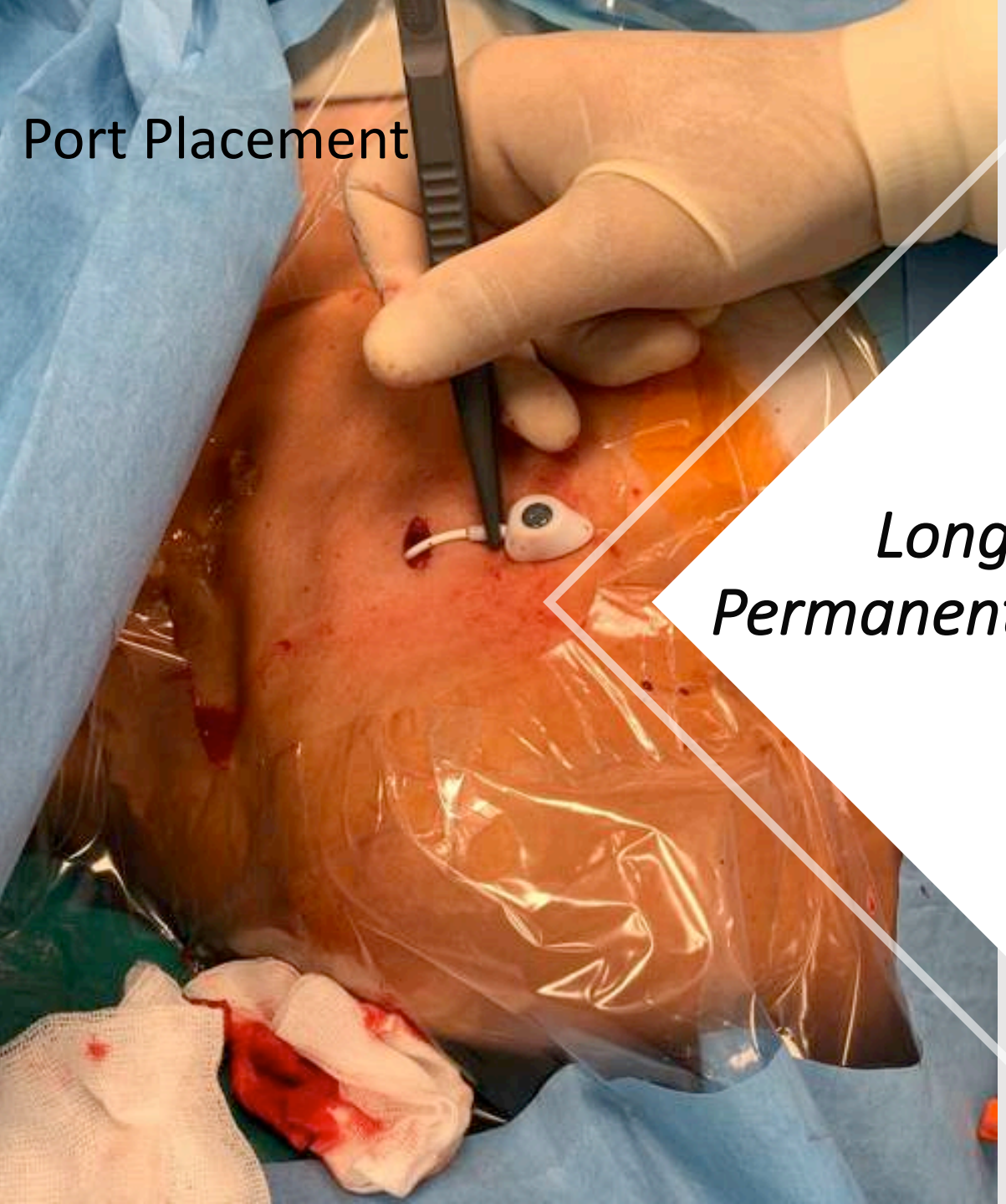
Complications and cost associated with parenteral nutrition delivered to hospitalized patients through either subclavian or peripherally-inserted central catheters

C T Cowl [1], J V Weinstock, A Al-Jurf, K Ephgrave, J A Murray, K Dillon

Alternative exit sites for central venous access: Back tunneling to the scapular region and distal tunneling to the patellar region

Matthew D Ostroff [1], Mauro Pittiruti [2]





Port Placement

Long Term / Permanent Securement

Native Access Via Arteriovenous Fistula

Subcutaneous Securement doe not attach to the hub of the catheter resulting in pull force narrowing the catheter resulting in it sliding through the device.

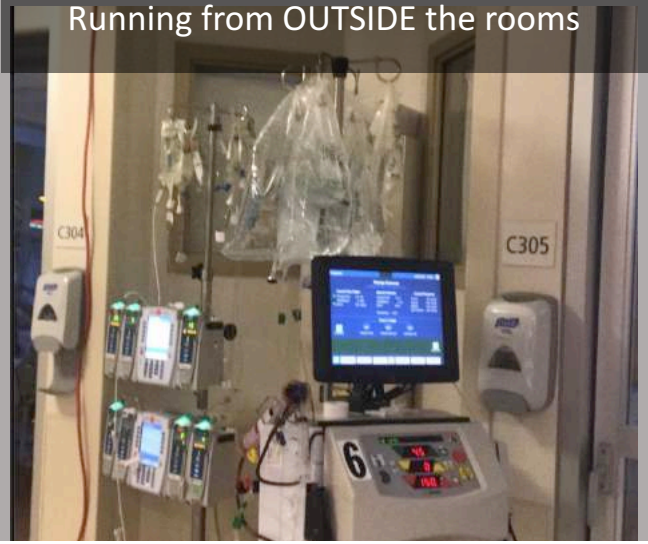
Sutured 2nd Site to Face but catheter not inside the securement device

Eroded Portacath

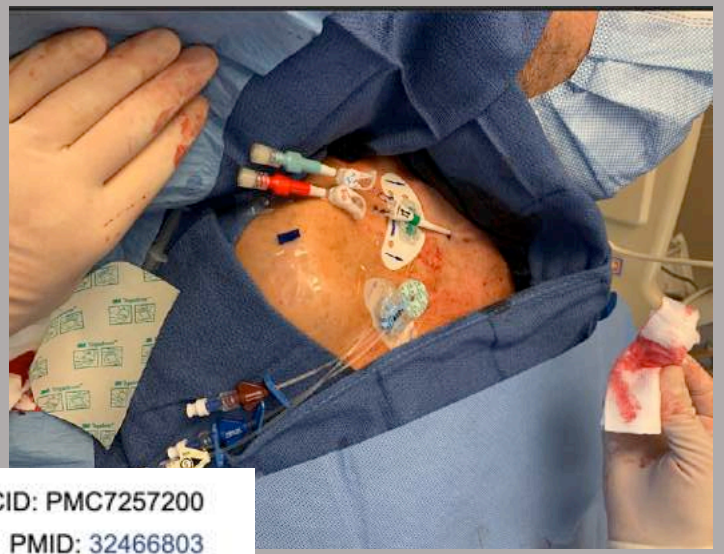
All Securement Can Fail

Securing Catheters for patients in the PRONE position,

Securing Catheters for Infusions Running from OUTSIDE the rooms



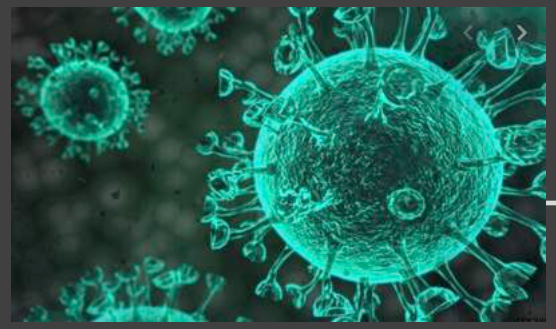
Securing Central Access for Central Medication Administration and Dialysis



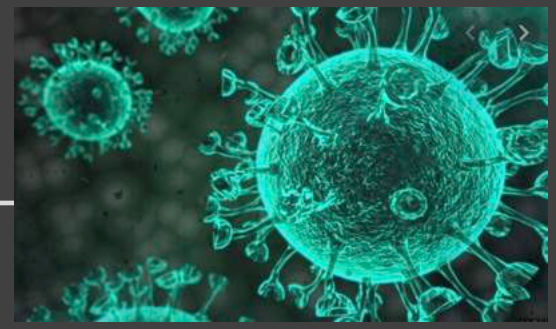
Crit Care. 2020; 24: 269.
Published online 2020 May 28. doi: 10.1186/s13054-020-02997-1
PMCID: PMC7257200
PMID: 32466803

Recommendations for the use of vascular access in the COVID-19 patients: an Italian perspective

Mauro Pittiruti,[✉1] Fulvio Pinelli,[2] and on behalf of the GAVeCeLT Working Group for Vascular Access in COVID-19



COVID and Catheter Securement




Thank You For Your Attention

References

- Atay, S., & Kurt, F. Y. (2020). Effectiveness of transparent film dressing for peripheral intravenous catheter. *The Journal of Vascular Access*, 1-6.
- Babu, R., & Spicer, R. D. (2001). "Cuff-stitch" to prevent inadvertent dislodgment of central venous catheters. *Pediatric Surgery International*, *17*, 245-246.
- Brescia, F., Fabiani, F., Borsatti, E., Parisella, L., Roveredo, L., & Pittiruti, M. (2020). Preprocedural ultrasound vascular assessment is essential to decision-making. *The Journal of Vascular Access*, 1-3.
- Cottrell, J. T., Chang, T., Baird, J., Barreras, J., & Elkhunovich, M. A. (2020). Ultrasound-guided placement of peripherally inserted intravenous catheters increase catheter dwell time in children. *The Journal of Vascular Access*, 1-5.
- Cowl, C. T., Weinstock, J. V., Jurf, A. A., Ephgrave, K., Murray, J. A., y, & Dillon, K. (2000). Complications and cost associated with parenteral nutrition delivered to hospitalized patients through either subclavian or peripherally inserted central catheters. *Clinical Nutrition*, *19*(4), 237-243.
- Dang, F.-P., Li, H.-J., & Tian, J.-H. (2019, February). Comparative efficacy of 13 antimicrobial dressings and different securement devices in reducing catheter-related bloodstream infections. *Medicine*, *98*(14), 1-12.
- Dugger, B., Macklin, D., & Rand, B. (1994, March). Veni-Gard versus standard dressings on hemodynamic catheter sites. *Dimensions of Critical Care Nursing*, *13*, 84-89.
- Frey, A. M., & Schears, G. (2001, March). Dislodgment rates and impact of securement methods for peripherally inserted central catheters (PICCs) in children. *Pediatric Nursing*, *27*(2), 185-189.
- Gautam, S., Agarwal, A., Kumar Das, P., Khuba, S., & Kumar, S. (2020). Prevention of epidural catheter migration: A comparative evaluation of two tunneling techniques. *Korean Journal of Anesthesiology*, 1-21.
- Helm, R. E., Klausner, J. D., Klemperer, J. D., Flint, L. M., & Huang, E. (2015, May). Accepted but unacceptable: Peripheral IV catheter failure. *Journal of Infusion Nursing*, *38*(3), 189-203.

References Cont.

- Kang, S. H., & Do, J. Y. (2020, March 6). Improvement of catheter-related outcomes after application of tunneled cuffed hemodialysis catheter insertion without fluoroscopy. *Yeungnam University Journal of Medicine*.
- Moon, J., Cho, S. U., Lee, J. W., Ryu, S., Cho, Y. C., & Jeong, W. J. (2017). Usefulness of new method of central venous catheter securement using a continuous suture. *American Journal of Emergency Medicine*, *35*, 961-963.
- Moureau, N. (2018). Impact and safety associated with accidental dislodgment of vascular access devices: A survey of professions, settings, and devices. *The Journal of the Association of Vascular Access*, *23*(4), 203-215.
- Moureau, N., Poole, S., Murdock, M. A., Gray, S. M., & Semba, C. P. (2002). Central venous catheters in home infusion care: Outcomes analysis in 50,470 patients. *Journal of Vascular Interventional Radiology*, *13*, 1009-1016.
- Ostroff, M. D., & Pittiruti, M. (2020, June 15). Alternative exit sites for central venous access: Back tunneling to the scapular region and distal tunneling to the patellar region. *The Journal of Vascular Access*, 1-5.
- Parent, J.-J., Megarbane, B., Kalfon, P., Thuong, M., Savary, B., Cheyron, D. D., Mongardon, N., Mira, J.-P., & Gros, A. (2015, September 24). Intravascular complications of central venous catheterization by insertion site. *The New England Journal of Medicine*, *373*, 1220-1229.
- Pinelli, F., Pittiruti, M., Boxtel, T. Van, Barone, G., Biffi, R., Capozzoli, G., Crocoli, A., Elli, S., Elisei, D., Fabiani, A., Garrino, C., & Graziano, U. (2020). GAVeCeLT-WoCoVA consensus on subcutaneously anchored securement devices for the securement of venous catheters: Current evidence and recommendations for future research. *The Journal of Vascular Access*, 1-10.
- Rutledge, L. F., DeCabooter, D. P., Walters, S.-A. H., & Bernatchez, S. F. (2015). Catheter securement systems: comparison of two investigational devices to a sutureless securement device, a securement dressing, and sutures in a pig model. *Intensive Care Medicine Experimental*, *3*(24).
- Spencer, T. R., & Pittiruti, M. (2018). Rapid central vein assessment (RaCeVA): A systematic, standardized approach for ultrasound assessment before central venous catheterization. *The Journal of Vascular Access*, *20*(3), 239-249.

References Cont.

- Struck, M. F., Friedrich, L., Schleifenbaum, S., Kirsten, H., Schummer, W., & Winkler, B. E. (2019, September). Effectiveness of different central venous catheter fixation suture techniques: An in vitro crossover study. *PLOS ONE*, 1-11.
- Ullman, A. J., Kleidon, T., Gibson, V., Long, D. A., Williams, T., McBride, C. A., Hallahan, A., Mihala, G., Cooke, M., & Rickard, C. M. (2016). Central venous access device securement and dressing effectiveness (CASCADE) in pediatrics: protocol for pilot randomized controlled trials. *BMJ Open*, 1-8.
- Ullman, A. J., Kleidon, T., Gibson, V., McBride, C. A., Mihala, G., Cooke, M., & Rickard, C. M. (2017). Innovative dressing and securement of tunneled central venous access devices in pediatrics: a pilot randomized controlled trial. *BMC Cancer*, *17*(595), 1-12.
- Wang, L., Wei, F., Chen, H., Jia, L., Li, B., & Jiang, A. (2020, July 24). Long-term outcome of posterior approach insertion of tunneled cuffed catheter: A single clinic retrospective analysis. *The Journal of Vascular Access*, 1-8.
- Wood, D., & Bowe-Geddes, L. A. (1997). A comparative retrospective analysis of two securement techniques for peripherally inserted central catheters (PICC) and midlines in the homecare setting. *Journal of Vascular Access Devices*, *2*(3), 11-16.
- Yamamoto, A. J., Solomon, J. A., Soulen, M. C., Tang, J., Parkinson, K., Lin, R., & Schears, G. (2002). Sutureless securement device reduces complications of peripherally inserted central venous catheters. *Journal of Vascular Interventional Radiology*, *13*, 77-81.