

XVIII PICC DAY

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2025

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Come minimizzare il rischio di dislocazioni



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Bologna 3 dicembre 2025

Subcutaneously anchored securement for peripherally inserted central catheters: Immediate, early, and late complications

Fabrizio Brescia¹ , Mauro Pittiruti² , Laura Roveredo¹,
Chiara Zanier¹, Antonietta Morabito¹, Elisabetta Santarossa¹,
Valentina Da Ros³, Marcella Montico⁴ and Fabio Fabiani¹

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Introduction

The optimal stabilization of the vascular device is part of all insertion bundles and is recognized as an important strategy to minimize the risk of complications. An adequate stabilization of a vascular access device must ensure the integrity of the device, minimize the movement of the catheter at the exit site, and prevent dislodgment of the catheter. Also, the method used to stabilize the catheter should not interfere with the assessment and control of the exit site.¹

When stabilization is not optimal, the main risk is catheter dislodgment. The literature reports an incidence of dislodgment between 5% and 15%, depending on the type of securement and on the definition of dislodgment (total vs

Leroyer C, Lashéras A, Marie V, et al. Prospective follow-up of complications related to peripherally inserted central catheters. *Med Mal Infect* 2013; 43(8): 350–355.

Gibson C, Conolly BL, Moineddin R, et al. Peripherally inserted central catheters: use at a tertiary care pediatric center. *J Vasc Interv Radiol* 2013; 24(9): 1323–1331.

Rapid Assessment of Vascular Exit Site and Tunneling Options (RAVESTO): A new decision tool in the management of the complex vascular access patients

Matthew D Ostroff¹ , Nancy Moureau² and Mauro Pittiruti³ 



Figure 3. Tunneled CICC (supraclavicular puncture, exit site in the scapular area).

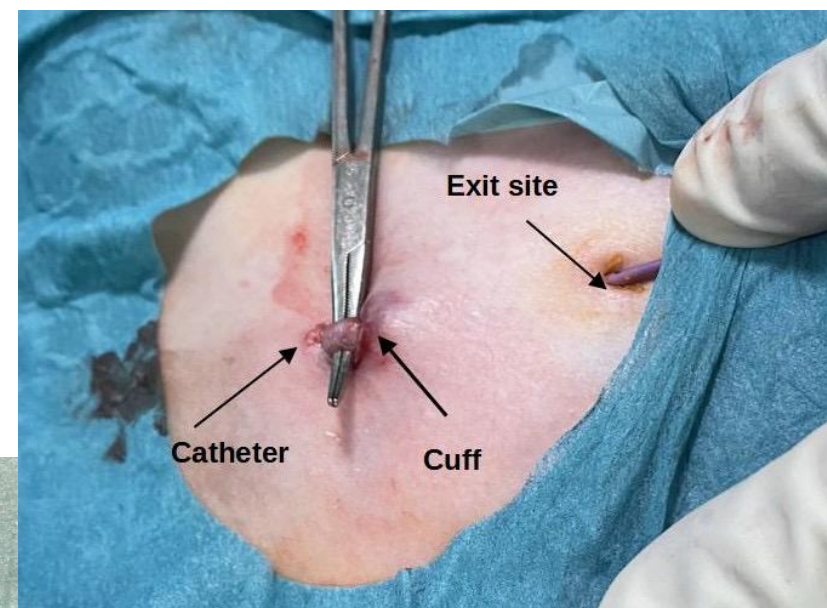
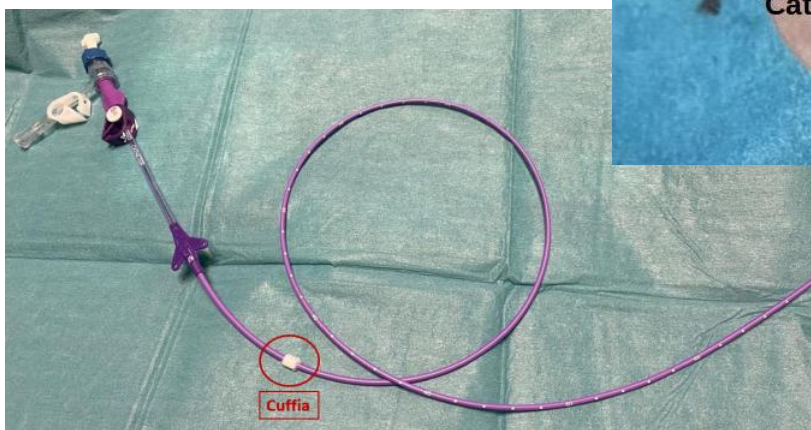
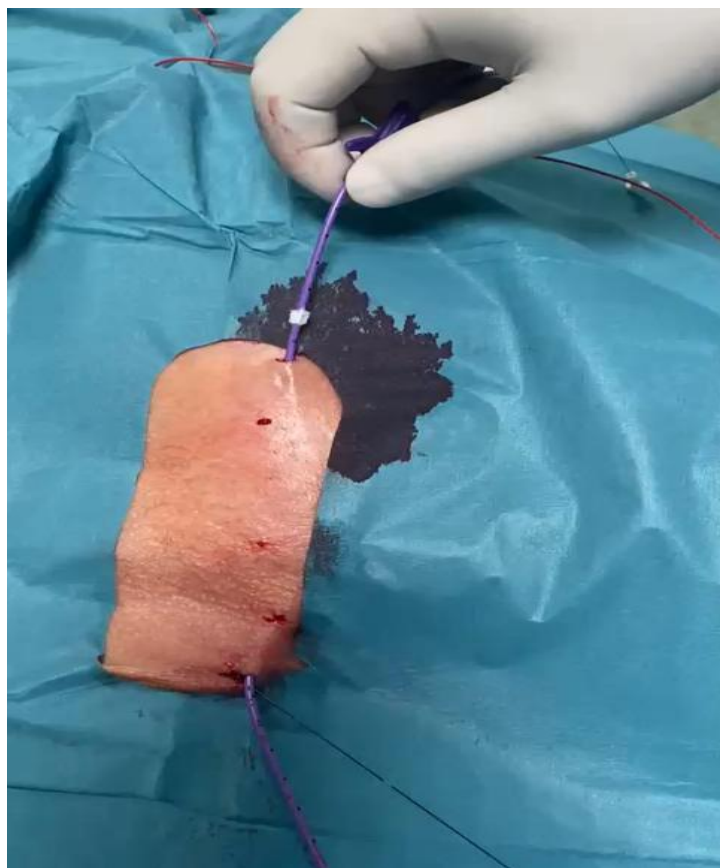


Figure 6. Tunneled CICC (infraclavicular puncture, exit site at the arm).

Tunnellizzazione



Cateteri cuffiati



Infusion Therapy Standards of Practice

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36. VASCULAR ACCESS DEVICE SECUREMENT

KEY DEFINITIONS

Adhesive securement device (ASD): an adhesive-backed device that adheres to the skin with a mechanism to hold the vascular access device (VAD) in place; a separate dressing is placed over the ASD. Both the dressing and ASD must be removed and replaced at specific intervals during the VAD dwell time.

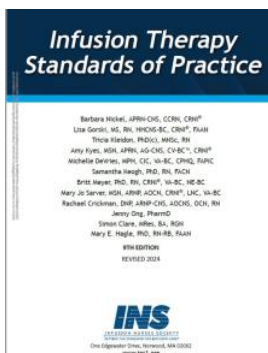
Integrated securement device (ISD): a device that combines a dressing with securement functions; includes transparent, semipermeable window, and a bordered fabric collar with built-in securement technology.

Subcutaneous anchor securement system (SASS): a securement device that anchors the VAD in place via flexible feet/posts that are placed just beneath the skin; these act to stabilize the catheter right at the point of insertion. A separate dressing is placed over the SASS. The SASS does not need to be changed at regular intervals when the dressing is changed; it can remain in place if there are no associated complications.

Tissue adhesive (TA): a medical-grade cyanoacrylate glue that can seal the insertion site and temporarily bond the catheter to the skin at the point of insertion and under the catheter hub. Depending on the chemical makeup, TA may be reapplied at each dressing change. Various formulations of TA for wound closure are commercially available, including first generation *N*-Butyl-2-cyanoacrylate (quick drying, rigid/brittle), second generation 2-octyl-cyanoacrylate (longer dry time, more flexible) and *N*-Butyl-2-octyl cyanoacrylate formation (increased tensile strength and flexibility) with an additional indication for vascular access securement. Each TA formulation has varied properties and the clinical decision to use should be based on research outcomes relative to the chosen product.

Practice Recommendations

- A. Use a securement method, such as adhesive securement device (ASD), integrated securement device (ISD), subcutaneous anchor securement system (SASS), or tissue adhesive (TA), in addition to the primary dressing, to stabilize and secure VADs. Inadequate securement can cause dislodgement and complications requiring premature removal.
 1. Additional securement as an adjunct to the primary dressing reduces motion at the insertion site and associated complications. Adequate securement can reduce pain, fear, and anxiety and reduces health care costs associated with VAD replacement.¹⁻¹¹ (I)
- B. Choose the most appropriate method for VAD securement based on factors including VAD type, patient age, skin turgor and integrity, anticipated duration of therapy, previous adhesive skin injury, and any type of drainage from the insertion site.¹²⁻¹⁴ (III)
- C. Avoid the use of sutures, as they are not an effective alternative to a securement method; sutures are associated with needlestick injury, support the growth of biofilm, and increase the risk of catheter-associated bloodstream infection (CABSI).^{15,16} (III)



- C. Avoid the use of sutures, as they are not an effective alternative to a securement method; sutures are associated with needlestick injury, support the growth of biofilm, and increase the risk of catheter-associated bloodstream infection (CABSI).^{15,16} (III)



Enfermería Intensiva (English ed.)
 Volume 29, Issue 3, July–September 2018, Pages 103–112



Original article

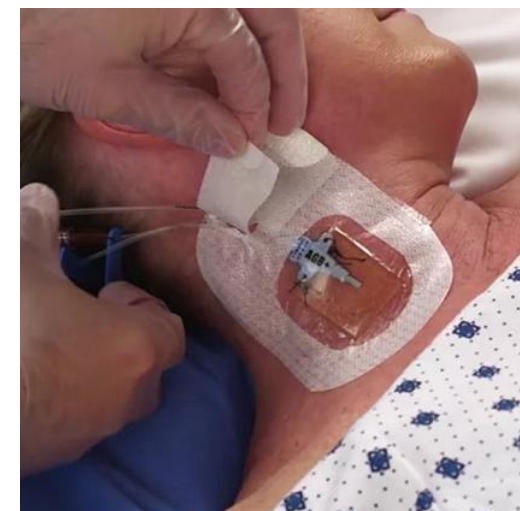
Comparative study on fixation of central venous catheter by suture versus adhesive device

Estudio comparativo sobre fijación de catéter venoso central mediante sutura versus dispositivo adhesivo ☆

C.S. Molina-Mazón RN, MSN^{a, b}, X. Martín-Cerezo RN^c, G. Domene-Nieves de la Vega RN^c,
 S. Asensio-Flores RN, MSN^d, J. Adamuz-Tomás RN, MSN, PhD^{e, f}

Conclusions

The catheters fixed with adhesive systems had fewer infectious complications and less displacement.



36. VASCULAR ACCESS DEVICE SECUREMENT

KEY DEFINITIONS

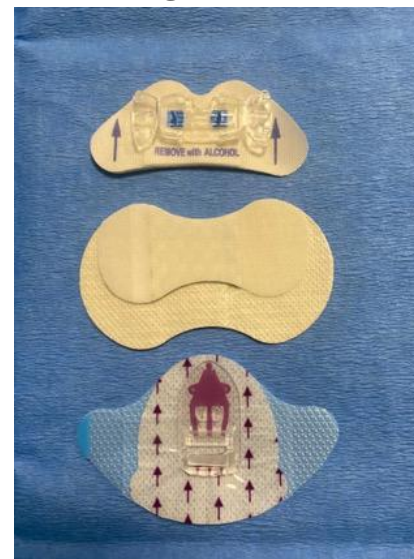
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ASD



ISD



TA



SASS



**Semipermeable
transparent dressing**

The SIC protocol: A seven-step strategy to minimize complications potentially related to the insertion of centrally inserted central catheters

Fabrizio Brescia¹ , Mauro Pittiruti² , Matthew Ostroff³ ,
 Timothy R Spencer⁴  and Robert B Dawson⁵

2

The Journal of Vascular Access 00(0)

Table 1. The seven steps of the SIC protocol.

Step 1	<i>Preprocedural evaluation</i> —choice of the vein by systematic ultrasound examination of the veins of the neck and of the supra/infraclavicular region (RaCeVA protocol) and choice of the ideal exit site (Central ZIM)
Step 2	<i>Appropriate aseptic technique</i> —hand hygiene, skin antisepsis with 2% chlorhexidine in 70% alcohol, maximal barrier precautions
Step 3	<i>Ultrasound-guided insertion</i> —ultrasound-guided venipuncture, ultrasound verification of the correct direction of the guidewire (tip navigation) and of the absence of pneumothorax (pleural scan)
Step 4	<i>Intra-procedural assessment of tip location</i> —verification of the central position of the tip by intracavitary ECG and/or by transthoracic echocardiography, using the “bubble test”
Step 5	<i>Adequate protection of the exit site</i> —reduction of the risk of bleeding and risk of contamination by sealing with cyanoacrylate glue
Step 6	<i>Proper securement of the catheter</i> —stabilization of the catheter using skin-adhesive sutureless devices, transparent dressing with integrated securement or subcutaneous anchorage
Step 7	<i>Appropriate coverage of the exit site</i> —use of semi-permeable transparent dressing, preferably with high breathability

The SIP protocol update: Eight strategies, incorporating Rapid Peripheral Vein Assessment (RaPeVA), to minimize complications associated with peripherally inserted central catheter insertion

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Fabrizio Brescia¹, Mauro Pittiruti²,
 Timothy R Spencer³ and Robert B Dawson⁴

Table 1. The eight steps of the SIP Protocol.

Step 1	<i>Pre-procedural evaluation</i> —choose most appropriate vein by systematic ultrasound examination of the veins of the arms (see the RaPeVA protocol)
Step 2	<i>Appropriate antiseptic technique</i> —adopt a strict policy of hand hygiene, skin antisepsis with 2% chlorhexidine in 70% isopropyl alcohol, and use of maximal barrier precautions
Step 3	<i>Choice of vein size and exit site</i> —evaluate the diameter of the vein so to have an ideal catheter-vein ratio (1:3 or less); place the exit site in the green zone (see Dawson’s ZIM™); consider the opportunity of tunneling the catheter, if the most appropriate vein is in the yellow zone (see the RAVESTO protocol)
Step 4	<i>Clear identification of median nerve and brachial artery</i> —identify each structure before venipuncture, using ultrasound
Step 5	<i>Ultrasound-guided venipuncture</i> —access a deep vein of the arm (either basilic or brachial vein), preferably adopting the short axis/out-of-plane approach, and use of a micro-introducer kit
Step 6	<i>Ultrasound-based tip navigation</i> —assess the correct direction of the guidewire, by a supra-clavicular ultrasound scan (see the ECHOTIP protocol)
Step 7	<i>Intra-procedural assessment of tip location</i> —use intracavitary ECG and/or ultrasound (subcostal or apical view, using the “bubble test”: see the ECHOTIP protocol)
Step 8	<i>Appropriate securement of the catheter and protection of the exit site</i> —use sutureless devices only; reduce the risk of bleeding and bacterial contamination using cyanoacrylate glue and semi-permeable transparent membrane dressings

The SIF protocol: A seven-step strategy to minimize complications potentially related to the insertion of femorally inserted central catheters

Fabrizio Brescia¹ , Mauro Pittiruti² , Matthew Ostroff³ ,
 Timothy R Spencer⁴  and Robert B Dawson⁵

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Table 1. The seven steps of the SIF Protocol.

Step 1	<i>Preprocedural evaluation</i> —choice of the vein by systematic ultrasound examination of the veins of the groin and the thigh (RaFeVA protocol) and choice of the ideal exit site (Femoral ZIM)
Step 2	<i>Appropriate aseptic technique</i> —hand hygiene, skin antisepsis with 2% chlorhexidine in 70% alcohol, maximal barrier precautions
Step 3	<i>Ultrasound-guided insertion</i> —ultrasound-guided venipuncture, ultrasound verification of the correct direction of the guidewire (tip navigation)
Step 4	<i>Intra-procedural assessment of tip location</i> —if the tip must be in IVC, use length estimation by anthropometric measurement and consider post-procedural x-ray; if the tip must be in RA or at IVC/RAJ, use intracavitary ECG and/or by transthoracic echocardiography (in subcostal view, using the “bubble test”)
Step 5	<i>Adequate protection of the exit site</i> —reduction of the risk of bleeding and risk of contamination by sealing with cyanoacrylate glue
Step 6	<i>Proper securement of the catheter</i> —stabilization of the catheter using skin-adhesive sutureless devices, transparent dressing with integrated securement, or subcutaneous anchorage
Step 7	<i>Appropriate coverage of the exit site</i> —semi-permeable transparent dressing, preferably with high breathability

Ten years of clinical experience with cyanoacrylate glue for venous access in a 1300-bed university hospital

Mauro Pittiruti, Maria Giuseppina Annetta, Bruno Marche, Vito D'Andrea and Giancarlo Scoppettuolo

KEY POINTS

- Glue is effective for securement only for short peripheral cannulas and epicutaneo-cava catheters and when used with a transparent semipermeable membrane
- At all central venous access devices, glue is effective in minimising local bleeding and is cost-effective as it reduces unscheduled dressing changes
- Glue is probably effective in minimising bacterial contamination for all central venous access devices but should be used only in the first week as replacing it every week may be harmful
- To close skin incisions, glue is effective and cost-effective for all venous access procedures

Table 1. Italian Group of Long-Term Venous Access Devices recommendations on the use of glue in venous access

1. Use cyanoacrylate glue

- As an additional securement of peripheral venous access devices at a high risk of dislodgement
Particularly in peripheral catheters with expected duration >48 hours
- For sealing the exit site of any central venous access device soon after insertion to avoid post-procedural local bleeding, prevent unscheduled dressing changes and protect the exit site from bacterial contamination during the first week
Use chlorhexidine-releasing sponge dressing (in non-tunnelled central catheters) after the first week
- For closing any skin incision related to venous access procedures (skin incisions for tunnelling or for subcutaneous port placement)
Never use stitches

2. Remember to prefer butyl-cyanoacrylate or octyl-butyl-cyanoacrylate

3. Use a minimal amount of cyanoacrylate glue and only at the time of insertion

Source: Pittiruti and Scoppettuolo (2021)

The antibacterial effect of 2-octyl cyanoacrylate (Dermabond®) skin adhesive

Jeremy I Rushbrook*, Grace White, Lizi Kidger, Philip Marsh, Thomas FO Taggart

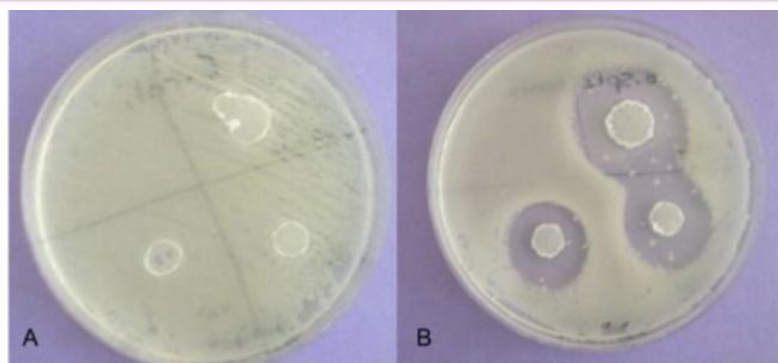


Figure 2. Photograph showing no inhibition of growth of a Gram-negative bacterium (A) and inhibition of growth of a Gram-positive bacterium (B) around the pellets of Dermabond®

Table 1. Size of inhibition ring around pellet after 10 days incubation

Micro-organism	Inhibition ring
Meticillin-resistant <i>Staphylococcus aureus</i>	+++
Coagulase-negative <i>Staphylococcus</i>	++
Oxford <i>Staphylococcus</i>	+++
Group G <i>Streptococcus</i>	+++
<i>Escherichia coli</i>	–
<i>Pseudomonas aeruginosa</i>	–
<i>Candida albicans</i>	–

Securing epidural catheters with histoacryl glue
Anesthesia 2008, 63,pages 316-327

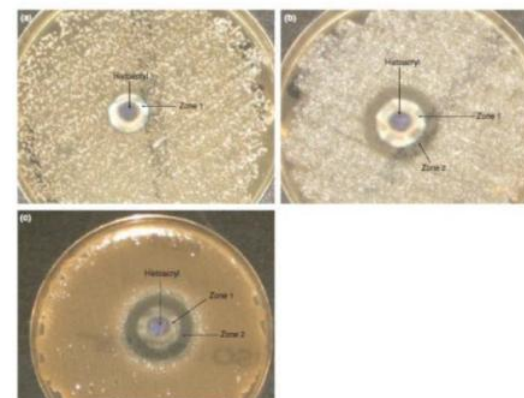


Figure 6 Examples of the effect of Histoacryl® upon the growth of (a) *Candida Albicans* demonstrating Zone 1, (b) *Enterococcus faecalis* demonstrating zones 1 and 2, (c) Methicillin resistant *Staphylococcus aureus*.

Table 1 Diameters of bacterial growth around the Histoacryl® adhesive.

Organism	Mean drop diameter: mm	Mean zone 1 diameter: mm	Mean zone 2 diameter: mm
<i>Candida albicans</i>	5	13	0
<i>Enterococcus faecalis</i>	5	14	23
<i>Escherichia coli</i>	5	12	0
MRSA	5	13	21
MSSA	6	14	27
<i>Pseudomonas aeruginosa</i>	5	11	0
<i>Streptococcus pneumoniae</i>	6	11	23
Coagulase negative staphylococcus	5	13	21

Use of cyanoacrylate glue for the sutureless securement of epicutaneo-caval catheters in neonates

Vito D'Andrea¹, Lucilla Pezza¹, Giovanni Barone²,
 Giorgia Prontera¹, Mauro Pittiruti³ and Giovanni Vento¹

Original research article

A GAVeCeLT bundle for central venous catheterization in neonates and children: A prospective clinical study on 729 cases

Mauro Pittiruti¹, Davide Celentano², Giovanni Barone³,
 Vito D'Andrea⁴, Maria Giuseppina Annetta⁵ and Giorgio Conti²

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Securement of Umbilical Venous Catheter Using Cyanoacrylate Glue: A Randomized Controlled Trial

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 Simonetta Costa, PhD¹, Martina Migliorato, MD¹, Giovanni Barone, MD³, Mauro Pittiruti, MD⁴, and Giovanni Vento, MD¹

ORIGINAL
 ARTICLES

ORIGINAL RESEARCH

Cyanoacrylate Securement in Neonatal PICC Use A 4-Year Observational Study

van Rens, Matheus RN, MaANP, NNP; Nimeri, Abdelghafar M. A. MD, CABP; Spencer, Timothy R. RN, APRN, BHSc,
 DipAppSc, IntCare Cert, VA-BC; Huggill, Kevin PhD, RN, BSc, PGCE, MSc; Francia, Ailene L. V. RN, BSc; Olukade, Tawa
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 Leslie PhD, APRN, FAAN, Section Editors

Author information

Advances in Neonatal Care 22(3):p 270-279, June 2022. | DOI: 10.1097/ANC.0000000000000963

Original research article

Octyl-butyl-cyanoacrylate glue for securement of peripheral intravenous catheters: A retrospective, observational study in the neonatal population

Matheus FPT van Rens¹, Timothy R Spencer², Kevin Huggill³,
 Ailene LV Francia¹, Fredericus HJ van Loon^{4,5} and
 Mohammad AA Bayoumi¹

European Journal of Pediatrics (2024) 183:5103–5112
<https://doi.org/10.1007/s00431-024-05800-3>

REVIEW

Use of tissue adhesive for neonatal intravenous access devices: A scoping review

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TA Tissue Adhesive



- Stabilizza momentaneamente il dispositivo
- Riduce il rischio di infezione dell'exit site e probabilmente di CRBSI
- Evita il sanguinamento locale e quindi la medicazione precoce
- Evita il movimento "dentro-fuori" (effetto pistoning)
- In Vitro effetto antibatterico
- Utilizzare Octyl-Butyl-Cianoacrilato o 2-Octyl-Cianoacrlato



- Non utilizzabile su cateteri in silicone

ASD Adesive securement device



- Stabilizzano il dispositivo
- Basso rischio di infezione dell'exit site e CRBSI



- Cambio settimanale del device
- Possibile distacco parziale del dispositivo
- Adesivi forti possono richiedere solventi specifici
- Movimento "dentro-fuori" non completamente evitabile
- Rischio di dislocazione parziale durante la medicazione
- Irritazione cutanea locale durante le sostituzioni periodiche
- Rischio di MARS (dermatiti da lesione da device adesivi)

ISD Integrated securement device



- Stabilizzano il dispositivo
- Basso rischio di infezione dell'exit site e CRBSI



- Cambio settimanale del device
- Possibile distacco parziale del dispositivo
- Movimento "dentro-fuori" non completamente evitabile
- Rischio di dislocazione parziale durante la medicazione
- Irritazione cutanea locale durante le sostituzioni periodiche
- Rischio di MARSI (dermatiti da lesione da device adesivi)

Semipermeable transparent dressing



- Adeguata protezione dell'exit site
- Stabilizza ulteriormente il dispositivo
- Riduzione delle infezioni dell'exit site, tunnel e CRBSI
- Consente l'ispezione quotidiana dell'exit site
- Buona traspirabilità
- Richiede la sostituzione ogni 7 giorni



- Richiede l'applicazione di un sutureless device (ASD o SASS)
- Possibile lesione cutanea da adesivo (MARSI)
- Utilizzare membrane ad alto indice di traspirabilità
[MVTR \(Moisture Vapor Transmission Rate\)](#) accettabile
se maggiore di 1500 g/m²/24h)

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

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Fulvio Pinelli¹, Mauro Pittiruti², Ton Van Bortel³, Giovanni Barone⁴,
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 Daniele Elisei⁹, Adam Fabiani¹⁰, Cristina Garrino¹¹, Ugo Graziano¹²,
 Luca Montagnani¹³, Alessio Pini Prato¹⁴, Giancarlo Scoppettuolo¹⁵, Nicola Zadra¹⁶,
 Clelia Zanaboni¹⁷, Pietro Zerla¹⁸, Evangelos Konstantinou¹⁹, Matt Jones²⁰,
 Hervé Rosay²¹, Liz Simcock²², Marguerite Stas²³ and Gilda Pepe¹³

SAS is effective in reducing the risk of dislodgment when used for securing PICCs and other types of central VADs in adult patients as well as in children and neonates.

There is no evidence that SAS may be effective in reducing other catheter-related complications such as venous thrombosis or exit site infection or blood-stream infection. There is no evidence either that they might increase the incidence of these or other major catheter-related complications.

SAS is associated with a low incidence of undesirable effects—most of them local and of low clinical relevance—which probably can be minimized by appropriate prevention and management.

Cost-effectiveness of SAS is demonstrated for central VADs staying in place for more than few weeks, and it is highly likely for all patients at high risk of dislodgment (children, neonates, non-compliant older patients, patients with skin abnormalities that makes them unsuitable for adhesive securement), independently from the expected duration of the VAD.

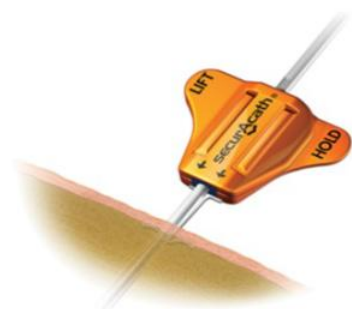
Efficacy and safety of SAS depend on their appropriate use by health practitioners; therefore, knowledge and training of personnel are crucial aspects.



Subcutaneously anchored securement for peripherally inserted central catheters: Immediate, early, and late complications

Fabrizio Brescia¹ , Mauro Pittiruti² , Laura Roveredo¹, Chiara Zanier¹, Antonietta Morabito¹, Elisabetta Santarossa¹, Valentina Da Ros³, Marcella Montico⁴ and Fabio Fabiani¹

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Our data confirm that subcutaneously anchored securement of PICCs is associated with very low risk of dislodgment and that this risk is limited to non-collaborative patients. In this population of patients, SAS must surely be used as securement, but they are not enough, since some other strategies should be added, such as tunneling the catheter so to move the exit site far from the hands of the patient (e.g. to the back or to the knee)¹⁸ away to an area not reachable by the patient and safer during mobilization.

Our data also show that the choice of a SAS of adequate size is a crucial point. A careful control of the actual correspondence of the catheter diameter as declared by the manufacturers and the possible use of SAS of smaller size for some catheters may be a further protection against the risk of dislodgment.

Safety and effectiveness of subcutaneously anchored securement for tunneled central catheters in oncological pediatric patients: A retrospective study

Alessandro Crocoli¹ , Cristina Martucci¹ , Luca Sidro², Daniela Delle Donne², Giuseppe Menna³, Mauro Pittiruti⁴ , Maria Debora De Pasquale⁵, Luisa Strocchio⁵, Gian Luigi Natali⁶ and Alessandro Inserra¹



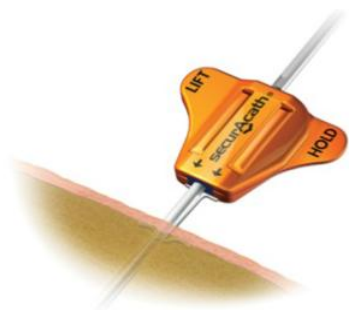
As regards the main goal of securement, in our experience SAS was highly effective, since we recorded only eight cases (2.6%) of catheter dislodgement, with a rate of 0.18/1000 catheter days, less than previously reported in literature.⁶

SAS was used for different size of catheters and both CICC, PICC, and FICC, as already reported in other studies.⁵ We successfully adopted SAS for both centrally and peripherally inserted central catheters, ranging from 3 to 10 Fr, with no difference in terms of clinical effectiveness in reducing the risk of dislodgment.

Our experience was focused on only tunneled catheters, both cuffed and non-cuffed.

SAS have a significant role in tunneled-cuffed catheters, where accidental dislodgement may be caused by two different mechanisms: incomplete adhesion of the Dacron cuff to the subcutaneous tunnel tissue in the early weeks after CVAD positioning, and/or excessive physical activity of the child. Most dislocations of cuffed CVAD occur within 2 months after insertion; younger age is the only

SASS Subcutaneous Anchor Securement System



- Stabilizzano il dispositivo
- Basso rischio di infezione dell'exit site e CRBSI
- Non richiedono la sostituzione. Assicurano la stabilizzazione per tutta la vita del catetere
- Movimento "dentro-fuori" completamente evitabile
- Nessun rischio di dislocazione parziale durante la medicazione
- Consente una medicazione dell'exit site a 360°



- In taluni casi "discomfort locale" per lo più da errata medicazione
- Possibilità di decubito se non medicato adeguatamente

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Grazie per l'attenzione



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Bologna 3 dicembre 2025