Universal adhesive vascular access securement with Grip-Lok devices

Andrew Barton

ABSTRACT

The use of sutureless, adhesive securement devices in vascular access has become recommended as best practice, because they are a cost-effective, reliable solution. After a vascular access device has been inserted, catheter securement is one of the most important aspects of care and maintenance. The Grip-Lok® range offers secure, comfortable adhesive securement for all types of vascular access devices. The products use hypoallergenic medical adhesive, which reduces the risk of skin irritation and provides a reliable, adaptable alternative to suturing.

Key words: Vascular access ■ Vascular access device ■ Grip-Lok ■ Hypoallergenic adhesive

Vascular access devices (VADs) are a vital part of health care (Alexandrou et al, 2015). Whether they are peripheral intravenous (IV) cannulas, peripherally inserted central catheters (PICCs) or acute central venous catheters (CVCs), all require careful consideration and planning before their insertion, as well as aftercare and maintenance.

After insertion, one of the most significant considerations for an indwelling VAD is securement. Different devices require different levels of this; PIVs, for example, can be secured with bespoke semipermeable IV film dressings, while longer term devices such as PICCs or midline catheters will need a more robust, secure solution. Adhesive securement devices are preferred over sutures because they offer securement without additional skin punctures.

Sutures were historically the only way to secure central VADs but, over time, adhesive solutions have been developed to replace sutures. Adhesive securement devices, such as the Grip-Lok (TIDI Products) and Statlock (BD), and invasive securement devices, such as SecurAcath (Interrad Medical), offer sutureless securement, especially for PICCs. However, the practice of suturing acute central venous catheters and tunnelled catheters continues (Inwood, 2014; Struck et al, 2019).

Andrew Barton, Advanced Nurse Practitioner IV Therapy and Vascular Access, IVAS Lead Nurse, Frimley Health NHS Foundation Trust, and National Infusion and Vascular Access Society (NIVAS) Chair, andrew.barton@nhs.net

Accepted for publication: March 2020

The use of sutures to secure VADs should be avoided as much as possible (Krenik et al, 2016). Moving away from sutures is a priority because stitching IV catheters in place can lead to needlestick injuries and is associated with an increased risk of catheter-related bloodstream infection (CRBSI). CRBSI is one of the most significant complications affecting indwelling VADs (Barton, 2019), and severe infections can be devastating to patients' lives. Skin punctures from suturing increase the risk of bloodstream infection (O'Grady et al, 2011) because they breach the protective nature of the skin barrier (De Hoog et al, 2017).

Micro-movements of the catheter at the exit site pose a significant risk of infection, which can be exacerbated by poor suturing technique at the catheter hub (Smith and Wyatt, 2008; Struck et al, 2019). Reducing the movement of the catheter around the exit site can help to reduce complications such as phlebitis, dislodgement, infiltration and vessel occlusion (Schears, 2006). Evidence shows that, when sutures are used as a secure method of holding VADs in place, there is an increased risk of complications such as infection including difficulties in care and maintenance under the sutured hub of the catheter (Infusion Nurses Society (INS), 2011).

Sutureless adhesive securement devices attach the device to the skin securely and can minimise catheter movement more efficiently than sutures, due to the larger anchoring ability of the device (Hill and Moureau, 2019). Adhesive catheter fixation/sutureless securement devices are considered more appropriate and are widely recommended for PICC placement (Hill and Moureau, 2019), and make care, maintenance and regular surveillance of the device as part of a care bundle more successful (Hanson, 2017). Continued care and maintenance of in-situ VADs are key to minimising CRBSI, and adhesive catheter securement devices used in conjunction with a dressing play a vital part in this (Dix, 2017).

The skin surrounding the exit site of an IV catheter can be maintained by protecting it from medical adhesive injuries (Evans, 2019), and, using a hypoallergenic adhesive catheter securement device such as a Grip-Lok product, covered by a semipermeable film dressing.

Numerous studies have determined that the introduction of sutureless fixation devices has reduced the use of needles to secure VADs, led to fewer needlestick injuries and, in the absence of sutures, can decrease the rate of CRBSIs (Schears, 2006; INS, 2011).

Table 1. Most common catheter securement devices

Device	System	Catheter size secured	Duration	Profile	Dead space
Statlock	Adhesive device	3 Fr–6 Fr	7 days	Medium	Yes
Grip-Lok	Adhesive device	Universal	7 days	Low	No
SecurAcath	Subcutaneous anchor	3 Fr–9 Fr	Same as catheter	Low	No
3M catheter securement	Adhesive device and film dressing	Universal	7 days	Medium	Yes

The use of sutureless securement is considered best practice for PICCs and is a component of their care and maintenance (Hill and Moureau, 2019). The use of sutures for securing non-cuffed central venous, tunnelled cuffed and femoral catheters is still common because of a lack of understanding and confidence in adhesive securement. A move towards sutureless securement for these types of central catheters is long overdue, but more evidence is required to show that catheter dislodgement will not be more likely without sutures.

The main types of sutureless catheter securement devices can be placed into two categories: subcutaneous anchoring devices; and adhesive securement devices.

Subcutaneous IV catheter anchoring devices such as SecurAcath are used to secure vascular access catheter sizes between 3 Fr and 8 Fr. The use of subcutaneous anchoring devices reduces catheter migration and is well-established in UK clinical practice. It is documented in the literature and recommended through the National Institute for Clinical Excellence (NICE) that Securacath use has led to significant reductions in catheter dislodgment; however, there are some drawbacks. The evidence has shown that the device can be uncomfortable and painful when in situ (Goossens et al, 2018), and the patient may experience pain during routine dressing changes, although not in the majority of cases. The device works by inserting two blunt hooks into the insertion site of the catheter, which is then locked into the device and keeps the catheter from migrating. Furthermore, the indwelling part of the device is made of metal, which some patients may be allergic to.

The second, more established type of securement devices are adhesive. These secure the catheter using a catheter-locking mechanism attached to an adhesive pad that is applied to the skin.

Both types of devices are covered with a semipermeable IV film dressing. Some adhesive fixation devices are made of foam, while others are a combination of film and plastic. The degree of adhesion depends on the device itself and the condition of the skin (Park et al, 2017). Hairy, moist or wet skin makes adhesion less reliable.

When using any medical product that involves adhesive, care must be taken to ensure the skin is prepared before attaching the device and when removing it. Medical adhesive-related skin injury (MARSI) can be significant and lead to complications. Anecdotally, some adhesive catheter fixation devices are associated with a higher risk of such injury because the adhesive used is very strong. Before applying the adhesive fixation device, the skin should be decontaminated with chlorhexidine solution. It is imperative to ensure the skin is dry after this process or a skin reaction can occur. Medical adhesive should be removed carefully and, if the patient has sensitive or fragile skin, an adhesive remover solution should be used. Medical adhesive skin injuries can be avoided if care is taken to assess the patient's skin before attaching adhesive devices. Potentially, using a hypoallergenic adhesive catheter securement device such as a Grip-Lok product could help reduce skin irritation (Ventura et al, 2016).

About Grip-Lok

The Grip-Lok range of catheter securement devices are available in a range of sizes and configurations so can be used universally. The devices secure IV catheters reliably, which minimises dislodgement during horizontal and vertical lifting, as well as accidental catheter dislodgement. Hypoallergenic skin contact adhesive is used to secure the device to the skin. Grip-Lok devices are made of soft, flexible fabric with breathable, latex-free material that is compatible with all silicone and polyurethane PICCs and other VAD catheters.

They are low profile and an adhesive flap is held in place with a Velcro-like hook-and-loop material to secure the catheter hub to the skin. There is no bulky, hard plastic mechanism that can create small areas of dead space; once covered by a film dressing, areas of dead space can trap moisture, which can lead to microbial colonisation (Rippon et al, 2016). This concept of dead space is common in wound management, and is relevant when considering coverage of IV devices (Rippon et al, 2016). The Grip-Lok devices create a smooth, flat platform so the IV dressing can cover the entire catheter hub, ensuring that the exit site is completely covered with the film dressing.

Experience with Grip-Lok

Having discovered the Grip-Lok device range, the author can recommend them in clinical practice. He has been placing vascular access devices for more than 10 years and, historically, has used the most common type of foam and plastic adhesive catheter securement devices, which he has found to be unsuitable in some situations because of their size and inflexibility.

The Grip-Lok range can be used as a primary securement method for all types of IV catheters. The author uses the universal Grip-Lok device to secure midline catheter extensions and as a secondary securement for acute, non-tunnelled central venous catheters. He also uses the Grip-Lok PICC securement, which has a foam cradle that fits the hub of the PICC.

The author's trust started to use Grip-Lok devices because the adhesive was hypoallergenic. Practitioners were seeing patients whose skin was reacting adversely to the adhesive used in the securement device that the trust had used for many years. The author's team trialled alternative devices and

found Grip-Lok devices did not cause irritation or skin breakdown. The trust also wanted an adhesive securement device that could be used for PICC and midlines in paediatric patients; it found that the Grip-Lok small and medium sizes performed well because of their low profile and the flexibility of the fabric material means the device can be wrapped around small limbs without causing discomfort or difficult in dressing. The author's team also found the hypoallergenic properties of the adhesive made removal less painful.

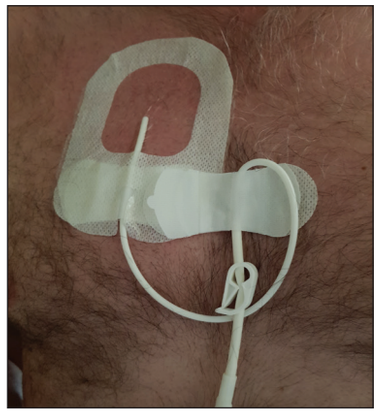
The author uses the universal Grip-Lok device to successfully secure cuffed tunnelled central venous catheters at the insertion site and, additionally, to secure the extra-luminal part of the catheter, which can often be quite long and cumbersome. The patients like the security of having an additional Grip-Lok device to stabilise the tunnelled catheter lumen. Since the team have been using the Grip-Lok range, we have seen no catheter migrations after insertion.

The use of Grip-Lok devices for primary and secondary fixation of vascular access devices and IV extension and infusion sets is now common at the author's trust and is included in the IV team's care and maintenance protocols. Their universally adaptable nature enables them to be used in a variety of bespoke securement scenarios. An evaluation of the Grip-Lok devices by the IV team within the author's trust found they could be used instead of the traditional foam adhesive securement device with the same if not better degree of reliability. No skin reactions to Grip-Lok were seen over a 6-month period; we would historically see on average two patients with skin reactions to the other fixation devices.

The IV team evaluated Grip-Lok devices, focusing on the securement of radial arterial catheters, midline catheter extensions, PICCs, tunnelled cuffed catheters and renal catheters. The evaluation had positive results and Grip-Lok performed well in all scenarios as a primary and secondary securement device.

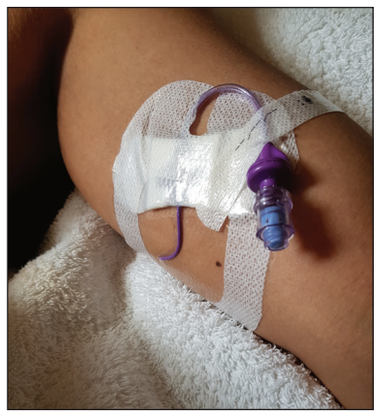
The IV team used Grip-Lok devices to secure tunnelled renal catheters instead of suturing on two occasions. The device secured both renal catheters in place without migration and its use was continued for both catheters until they were removed. Grip-Lok products are now commonly used by the IV team to secure tunnelled renal catheters.

The author's ambition is to trial the Grip-Lok device for acute CVC securement instead of suturing. Acute CVCs are usually inserted into the internal jugular around the neck and, less often, into the subclavian or axillary vein. The evidence indicates that these catheters are associated with an increased risk of infection because of their location and the short distance from exit site to the blood stream (Andersen, 2019). The use of sutures here can increase the risk of infection and using the Grip-Lok CVC would eliminate some of this risk. However, in the author's trust, there is little appetite to trial adhesive securement devices instead of suturing, especially in the critical care environment. Changing preconceptions and attitudes about the reliability of adhesive securement instead of suturing remains the biggest hurdle to even start a trial (Karpanen et al, 2016; Struck et al, 2019; Hade et al, 2020).

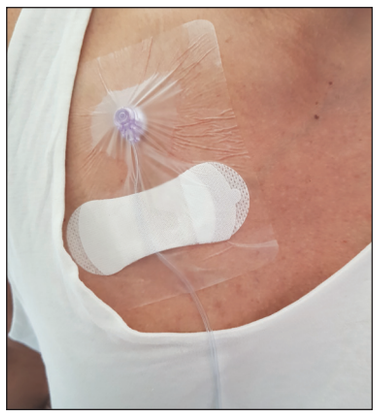


(a) Case study 1. PICC line

(b) Case study 2. Arterial blood gas sampling



(c) Case study 3. Skin sensitivity



(d) Case study 4. Dislodgement

Figure 1. Case studies

Case study 1. PICC line

The patient was a 45-year-old man with Hodgkin's lymphoma. He had had a skin reactions to medical adhesives following PICC insertion.

The patient's skin was managed with barrier film dressings but, eventually, the PICC had to be removed and a tunnelled, cuffed catheter was inserted into the right internal jugular and tunnelled to the right side of the chest.

A Grip-Lok device was used to hold the catheter in place instead of suturing. The exit site was covered with a semipermeable film dressing and a second Grip-Lok device was used to support the lumen of the catheter because the weight of the external catheter and hub created unwanted traction on the indwelling catheter; the secondary anchor also prevents the catheter from being pulled inadvertently (*Figure 1a*). The patient found the catheter securement comfortable.

The Grip-Lok device was changed every 7 days along with the dressing and needle-free connectors. After 3 weeks, the primary Grip-Lok device was removed because the subcutaneous tissue had grown into the Dacron cuff, which was doing its job of securing the catheter in place. The secondary Grip-Lok was still used to support the lumen of

KEY POINTS

- Adhesive devices have an advantage over sutures as the latter are associated with an increased risk of infection
- Grip-Lok devices offer adhesive securement to a variety of vascular access devices and can be used as a secondary securement device, which can support long or multiple lumens
- A move away from suturing IV devices in situ should be considered and the Grip-Lok devices offer an adhesive alternative
- Grip-Lok uses hypoallergenic adhesive, so skin reactions can be prevented
- Because of their versatile nature, Grip-Lok products can be used as standard for all vascular access device securement; the products work in the same way, training in its use is simple and it is cost-effective

the catheter. The patient had no skin reaction to the device and it did not migrate out in the absence of sutures. This was a successful use of the Grip-Lok device.

Case study 2. Arterial blood gas sampling

A 32-year-old man was admitted with an exacerbation of asthma and required level one respiratory care with non-invasive ventilation.

Part of his treatment regimen required him to have regular arterial blood gas sampling. A radial artery catheter was inserted aseptically and secured to the skin using a Grip-Lok device. The arterial catheter would usually be sutured in place or secured with adhesive wound closure strips and covered with a film dressing (*Figure 1b*). The Grip-Lok product enabled the arterial catheter to be reliably secured, and its low-profile nature allowed the film dressing to be placed securely on the catheter with no areas of dead space.

A secondary Grip-Lok device was used to secure the IV tubing of the arterial monitoring and sampling set instead of medical tape. This was a successful use of a Grip-Lok product. It has been a struggle in the past to keep the arterial catheter secured because the additional IV tubing attached it could become caught in the bed frame and, when the patient moved, the arterial catheter could be dislodged. The use of the second Grip-Lok device has reduced this.

Case study 3. Skin sensitivity

In this case study, a Grip-Lok PICC securement device was used in a patient who had previous PICC insertions and experienced a skin reaction to the adhesive in other securement devices.

The patient was a 41-year-old woman with breast cancer undergoing IV chemotherapy treatment. A Grip-Lok device with a foam cut-out to support the PICC hub was used from insertion (*Figure 1c*), then changed every week when the dressing was changed. No skin reaction was noticed when the Grip-Lok device was used.

During the dressing change, the skin was cleaned in the usual way with chlorhexidine 2% and alcohol solution and allowed to dry. A new Grip-Lok PICC was applied and the same type of semipermeable IV dressing placed on top.

The use of Grip-Lok devices was not part of the trust's strategy to avoid or treat medical adhesive skin injury. However, this has changed and it is now.

Case study 4. Dislodgement

In this case, a 50-year-old woman had a Port-a-Cath (Smiths Medical) in place for long-term maintenance treatment for an immunology disorder (*Figure 1d*). The patient attended the infusion day unit once a month for 4 consecutive days.

On the first day, the Port-a-Cath was accessed using a ¾ inch non-coring needle. The non-coring needle set was covered with a semipermeable film dressing to secure it in place. The patient kept the non-coring needle and film dressing in place for 4 days. She went home with access in situ and returned to the IV unit each day for her IV infusion therapy.

The patient was having problems with the non-coring needle being dislodged overnight while she was asleep. The extension set and needle-free extension set was getting caught in bedclothes and bedding during night-time movements.

A Grip-Lok device was used to secure the non-coring set to the chest, which prevented the non-coring needle from being inadvertently malpositioned. This also made the device more secure when the infusion set was connected during therapy administration. The use of Grip-Lok gave the patient peace of mind and reduced the risk of infection associated with repeated and continuous accessing of the Port-a-Cath during the same episode of infusion therapy.

Conclusion

Adhesive catheter securement devices offer a painless, comfortable and reliable method of vascular access device securement. The evaluation of the Grip-Lok devices was positive, and all aspects of it work well in clinical practice. A box of Grip-Lok devices does not take up much storage space and individually wrapped units are small; both considerations are important at the author's trust where storage space is lacking.

Unfortunately, it has not been possible trial the use of the Grip-Lok device as an alternative to suturing CVCs in place in the internal jugular in the UK despite it being used in other parts of the world. This was because of unfounded concerns about moving away from suturing, and more evidence is required to move this forward.

Grip-Lok devices have become part of our vascular access device care and maintenance regimens and, because of their universal and adaptable nature, the author recommends their use in clinical practice. **BJN**

Declaration of interest: this article was supported by Tidi Products; the author was commissioned to write this article and will receive an honorarium

Alexandrou E, Ray-Barruel G, Carr PJ et al. International prevalence of the use of peripheral intravenous catheters. J Hosp Med. 2015;10(8):530–533. https://doi.org/10.1002/jhm.2389

Andersen BM. Central intravascular catheter (CVC). In: Prevention and control of infections in hospitals. Springer, Cham; 2019

Barton A. The case for using a disinfecting cap for needlefree connectors. Br J Nurs. 2019;28(14):S22-S27

de Hoog S, Monod M, Dawson T et al. Skin fungi from colonization to infection. In: Heitman J, Howlett BJ, Crous PW, Stukenbrock EH, James TY, Gow NAR (eds). The fungal kingdom. Wiley Online Library; 2017: 855–871. https://doi.org/10.1128/9781555819583.ch41
Dix D. Ten years…. one CLABSI peripheral approach……. 20,536 PICC lines: ownership, commitment, technology, and diligence. Am J Infect Control. 2017; 45(6):S115. https://doi.org/10.1016/j.ajic.2017.04.196
Evans M. Appeel® Sterile silicone medical adhesive remover may reduce the incidence of medical adhesive related skin injuries. Br J Nurs. 2019;28(6):S12–S13. https://doi.org/10.12968/bjon.2019.28.6.S12
Gabriel J. Vascular access devices: securement and dressings. Nurs Stand. 2010;24(52):41–46. https://doi.org/10.7748/ns.24.52.41.s51
Goossens GA, Grumiaux N, Janssens C et al. SecurAstaP trial: securement with SecurAcath versus StatLock for peripherally inserted central catheters, a randomised open trial. BMJ Open. 2018;8(2): p.e016058
Hade AD, Beckmann L, Basappa B. Central venous catheter tip position on chest radiographs: a reply. Anaesthesia. 2020;75(1):126-126
Hanson D. Reducing central line-associated bloodstream infection rates in the context of a caring-healing environment: a patient safety program evaluation. J Infus Nurs. 2017;40(2):101–110. https://doi.org/10.1097/NAN.0000000000000212
Hill S, Moureau NL. Right securement, dressing, and management. In: Moureau N (eds). Vessel health and preservation: the right approach for vascular access. Cham: Springer; 2019
Infusion Nurses Society. Infusion nursing standards of practice. J Infus Nurs 2011;34(1S):1-110
Inwood S. An exploration of the past, present and future of catheter securement. Br J Nurs. 2014;23(8):S26–S27. https://doi.org/10.12968/bjon.2014.23.Sup8.S26
Karpanen TJ, Casey AL, Whitehouse T, Nightingale P, Das I, Elliott TS. Clinical evaluation of a chlorhexidine intravascular catheter gel dressing on short-term central venous catheters. American Journal of Infection Control. 2016;44(1):54-60
Krenik KM, Smith GE, Bernatchez SF. Catheter securement systems for peripherally inserted and nontunneled central vascular access devices: clinical evaluation of a novel sutureless device. J Infus Nurs. 2016;39(4):210–217. https://doi.org/10.1097/NAN.0000000000000174
O'Grady NP, Alexander M, Burns LA, et al. Guidelines for the prevention of intravascular catheter-related infections. Clin Infect Dis. 2011;52(9):e162–e193. https://doi.org/10.1093/cid/cir257
Park KH, Seong KY, Yang SY, Seo S. Advances in medical adhesives inspired by aquatic organisms' adhesion. Biomaterials research. 2017;21(1):16
Rippon MG, Ousey K, Cutting KF. Wound healing and hyper-hydration: a counterintuitive model. J Wound Care. 2016;25(2):68–75. https://doi.org/10.12968/jowc.2016.25.2.68
Schears GJ. Summary of product trials for 10,164 patients: comparing an intravenous stabilizing device to tape. J Infus Nurs. 2006;29(4):225–231. https://doi.org/10.1097/00129804-200607000-00009; correction in J Infus Nurs. 2006;29(5):242
Smith PR, Wyatt R. Tissue adhesive as an alternative to sutures for securing central venous catheters. Anaesthesia. 2008;63(5):559–560. https://doi.org/10.1111/j.1365-2044.2008.05534.x
Struck MF, Friedrich L, Schleifenbaum S, Kirsten H, Schummer W, Winkler BE. Effectiveness of different central venous catheter fixation suture techniques: An in vitro crossover study. PLoS One. 2019;14(9):e0222463. https://doi.org/10.1371/journal.pone.0222463
Ventura R, O'Loughlin C, Vavrik B. Clinical evaluation of a securement device used on midline catheters. Br J Nurs. 2016;25(14):S16–S22. https://doi.org/10.12968/bjon.2016.25.14.S16

CPD reflective questions

- How could the use of adhesive securement devices improve vascular access practice in your organisation?
- Have you audited the rate of vascular access device dislodgement in your practice? Consider what changes in practice you could implement
- Who is central vascular access devices in your organization, are they aware of the best practice thinking in catheter securement? What can you do to ensure standardisation in the whole of your organisation?