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Clinical background and rationale

Why burns are different

- Major burns are rare and highly complex, with cardiovascular, renal, and immunological derangements.
- Vascular access becomes difficult because the operator may need to cross compromised or colonized skin.
- Compared with intact skin, catheter placement in burn patients has higher infectious, thrombotic, and mechanical risk.

Knowledge gap

- Standard vascular access training provides limited specific guidance for rare conditions such as major burns.
- Device choice, insertion site, fixation, and planned replacement often depend on local expertise rather than standardized criteria.
- A structured algorithm can reduce variability and support expert decision-making in a high-risk setting.



Objective and review methods

Objective 1

Identify the most suitable vascular devices for adults with burned skin versus intact skin.

Objective 2

Develop a decision-making algorithm for CVC selection and management.

Population

Adults with TBSA $\geq$ 20% and major burn-related access needs.

Methods

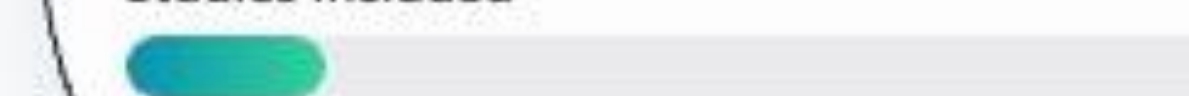
- Systematic literature review from 2010 to present.
- Languages: Italian and English.
- Databases: PubMed, Embase, Cochrane, CINAHL, JBI, EBN, EPIC.
- PICO: P = major burns; I = CVC placement; C = burned skin vs intact skin; O = reduction of complications.

Selection flow

Articles screened



Studies included



Included studies were mainly retrospective case-control or cohort studies selected for full-text analysis.

Key evidence from literature

4×

Infection risk

Insertion through burned skin shows about fourfold higher infection risk than intact skin.

7–8 d

Dwell time

CVC duration is the strongest independent predictor of CLABSI, with risk rising after day 7–8.

Femoral

Highest burden

Femoral access is linked to the highest CLABSI and DVT rates among common central sites.

Mupi.

Antisepsis

Topical mupirocin lowers bacterial colonization at the exit site and catheter tip.

96%

US-guided success

Predictive nursing with ultrasound improves first-pass success versus 82% and reduces pain/anxiety.

Site preference in practice: the internal jugular vein is often chosen for accessibility, but technical drawbacks remain in ventilated patients.

Clinical implication: safe management depends on multimodal prevention, not on insertion site alone.

Step 1

Initial evaluation

- Assess hemodynamic urgency and expected infusion burden.
- Map available insertion zones and burn-free windows.
- Verify existing vascular devices and oncologic/chronic history.

Step 2

Site priority

- Intact skin: always first choice.
- Subclavian: preferred when intact skin is unavailable.
- Femoral: second option despite contamination risk.
- Internal jugular: third option because of kinking risk in ventilated patients.

Step 3

Device and management

- Short-term 3-lumen CVC (e.g., Arrow).
- Consider medicated catheters with rifampicin/fluconazole or chlorhexidine.
- Schedule replacement every 7 days in septic or high-risk patients.

Conclusions and future direction

Main take-home messages

- No study directly compares CVC placement on burned skin with placement on intact skin in a definitive way.
- Available data still support a multimodal strategy combining site selection, strict dwell-time control, antisepsis, and tailored nursing care.
- The algorithm offers an objective support tool for the expert implanter facing urgent but high-risk choices.

Future perspective

- Multicenter prospective studies are needed to validate the algorithm.
- Burn-specific dressing and fixation materials should be developed for compromised skin.
- Training pathways should include rare but high-risk contexts such as major burns.

“In the world of burns, skin integrity isn't just an anatomy lesson—it's the front line of patient safety.”