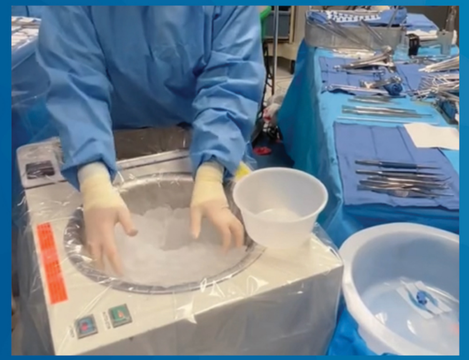

The Use of Sterile Surgical Slush in the Operating Room

Lillian H. Nicolette, MSN, RN, CNOR, FAORN; Ruth P. Shumaker, MS, BSN, RN, CNOR; Evangeline (Vangie) Dennis, MSN, RN, CNOR, CMLSO, FAORN, FAAN

Executive Summary

Sterile surgical slush plays a critical role in tissue and organ preservation in **transplant, cardiovascular, neurosurgery, GU**, and **orthopedic** procedures.

By reducing tissue metabolism and ischemic injury, it supports improved clinical outcomes. This study evaluates **open-basin slush unit exposure times**, impacts on sterility, and the benefits of standardized practices.

Clinical Significance

Sterile slush is used in:

Organ transplantation to maintain graft viability pre-anastomosis.

Cardiac surgery to protect myocardium during cardioplegia.

Orthopedic & GU surgery to minimize inflammation and bleeding.

Reconstructive procedures to support graft survival.

Purpose of the Study

Evaluate the **efficacy** and **clinical impact** of open-basin slush systems

Identify **exposure times** and variables affecting sterility and tissue preservation.

Provide **best practice recommendations** for perioperative team

Study Design

Type: Time & Motion Study

Period: Dec 2004 – Mar 2025

Sites: 3 academic health systems (transplant & cardiac programs)

Cases: 47 cardiac & transplant procedures

Endpoints:

Ambient exposure time (fill – use)

Completion time (last use – case end)

System leaks, workflow variables

A Time & Motion Study of Open-Basin Slush Units: Enhancing Tissue Preservation and Surgical Outcomes

Mechanism of Action

Surgical slush preserves tissue by:

- ✓ Lowering metabolic demands reduces ischemic injury
- ✓ Reducing inflammatory responses reduces postoperative complications
- ✓ Inducing vasoconstriction reduces bleeding and increases visualization

Best Practices for Slush Use

Preparation

- Use sterile closed-system ice generation
- Maintain 0°C – 4°C temperature

Application

- Use sterile barriers
- Avoid unnecessary exposure
- Monitor tissue temperature

Environmental Controls

- Minimize traffic, maintain positive pressure
- Strict AORN sterile technique adherence
- Disinfect surfaces routinely

Data Summary & Key Findings

METRIC	TOTAL (47 CASES)	AVERAGE PER CASE
Exposure Fill Through 1st Use	7,949 min (132.5 hrs)	169.1 min (2.82 hrs)
Completion Last Use Through Case End	5,308 min (88.5 hrs)	112.9 min (1.88 hrs)

Min/Max Slush 1st Use: 61 min – 266 min

Min/Max Completion: 19 min – 305 min

2 identified sterile field breaches from drape leaks in open-basin systems

Closed-System Slush

- ✓ Eliminates ambient exposure
- ✓ Intact sterile barrier seal
- ✓ Consistent temperature
- ✓ Reduced contamination
- ✓ Better organ/tissue protection

Open-Basin Slush

- X 169 min average exposure
- X Leak risk
- X Evaporation & uneven cooling
- X Increased airborne exposure
- X Greater variability

Ethical & Operational Notes

No IRB required (time & motion only)

Surgical & perioperative committee approval

Real-world perioperative workflow observations

References

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Recommendations

Standardize slush preparation protocols

Minimize ambient exposure through closed systems

Implement continuous monitoring of exposure times

Root cause analysis for outlier cases

Benchmark against AORN guidelines for sterility.

Conclusion

Sterile surgical slush remains a cornerstone of tissue preservation. This study demonstrates **significant ambient exposure time** with open-basin systems, increasing contamination risk. **Closed systems** offer better sterility, temperature control, and tissue protection, aligning with AORN's sterile technique recommendations.

Clinical Implication: Transitioning to closed slush systems can **enhance patient outcomes** and reduce SSI risk.

Disclosures

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Correspondence:

Lillian H. Nicolette, MSN, RN, CNOR, FAORN Email: lhnicolette@gmail.com