



Quality & Safety Control: Safe Application of Liquid Nitrogen in Limb Salvage Procedure

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Our Challenges

- Use of intra-op Liquid Nitrogen (LN₂) in recycling resected tumor-bearing bone segment
- Firstly introduced by O&T Oncology Team, QMH in March, 2015
- Immerse resected bone in LN₂ (-196°C) for 20 mins, then perform reconstruction

Benefit of Limb Salvage Procedure

- ✓ Preserve limb – Prevent amputation
- ✓ Use auto-graft for reconstruction
- ✓ No rejection



Methodology

- Before the very first LN₂ operation, we...

Literature Review

- Global LN₂ Operations
- Safety Guidelines

Site Visits

- Local
- Overseas: Japan

Kanazawa University Hospital



Stem Cell Laboratory



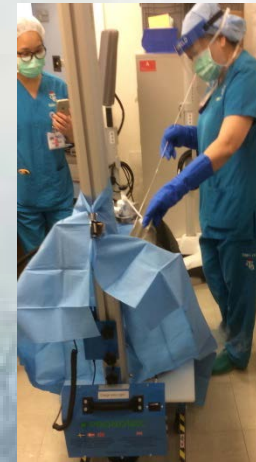
Team Approach

- O&T Surgeons
- OSH Team
- ICN
- OR Nurses

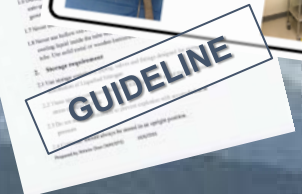


Testing

- Procedure Simulation



Set up In-house Guideline on Perioperative Safe Handling of LN₂



3 Perioperative Safety Issues



PPE to
Protect
Staff
Safety

Strict Aseptic Technique



On-going Assessment
of LN₂ level

- ✓ Ensure the graft is fully immersed
- ✓ Maintain sterility by draping
- ✓ Suitable Insulated Container



Isolated Area
Away from Patient



Fishing Technique



Dewar Tank



Oxygen Saturation Sensor
& Alarm System



Automatic
Exhaust System

Ensure vaporization in a
ventilated &
quarantined area



Caution Signs





Result & Outcome

- 5 LN₂ surgeries successfully performed with the in-house protocol established.
- No injury/ complication reported.
- Collaboration among our perioperative healthcare team is important.
- Trial run for every newly developed procedure is essential for protocol development.



Thank you!

Acknowledgement

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