INTERNATIONAL FROSTBITE RESOURCE GROUP

Doctor Frostbite Management Protocol (adult)

Review precautions, contraindications, and administration instructions before use.

Patient Label

Date:

Time:

Patient weight:

Treat hypothermia and/or severe trauma first

General Management – all Cauchy Grades

- ☐ Handle carefully and protect from direct trauma
- ☐ Remove jewellery, tight clothing or anything else that may constrict the affected limb
- ☐ Initiate rewarming as soon as possible; water 37 – 39 °C; until soft and pliable (30 mins or longer)
- ☐ Allow skin to air dry or dab very gently (do not rub)
- ☐ Elevate affected part
- ☐ Avoid walking if feet affected (unless only tips of toes affected when a reverse tilt boot can be used)
- ☐ Aspirate/debride clear filled blisters (consult surgeon if this is local policy)
- ☐ Dress lightly with non-adhesive dressings, wrapping each affected digit individually
- ☐ Encourage oral hydration or start warm iv normal saline boluses
- ☐ Advise avoidance of tobacco and alcohol
- ☐ Follow-up with daily soaks in warm tap water (30 min) followed by redressing

Medications

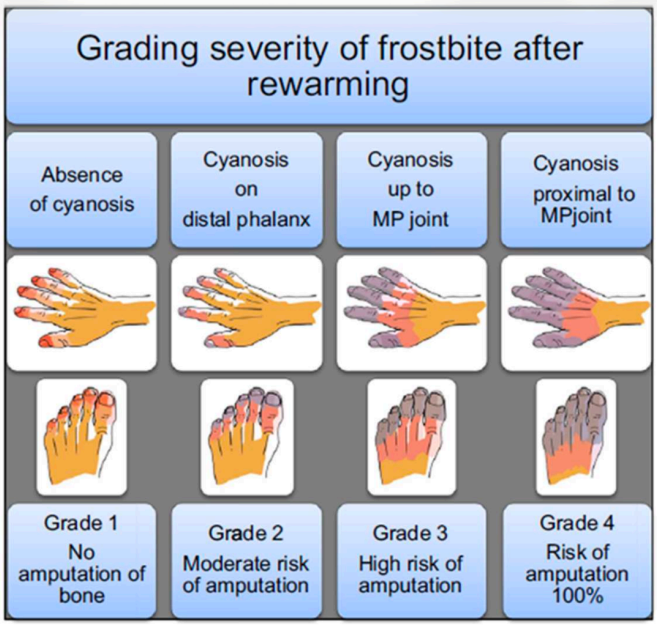
- ☐ Aloe vera gel topically to frostbitten parts, daily
- ☐ Ibuprofen 600mg oral every 6 hours for 5 days (**NOT** if tPA and LMWH planned)
- ☐ Morphine 5-10mg oral every 4 hours as needed for pain
- ☐ Morphine 2-5mg intravenous every 2 hours as needed for pain
- ☐ Fentanyl 25-50mcg intravenous every 5 minutes as needed for pain (maximum 150 mcg/hour)
- ☐ Proton pump inhibitor (PPI) in standard dose for 5 days

Cauchy Grades 2 – 4

- ☐ Full blood count, electrolytes, creatinine, urea, PTT, INR
- ☐ Ensure staffing availability for patient monitoring every 15 minutes for 2 hours, then every 30 minutes until completion of the infusion.
- ☐ Iloprost intravenous infusion
    - Dilute 50 micrograms (0.5 mL) in 250 mL of 5% dextrose to achieve a final concentration of 0.2 micrograms/mL.
    - Start intravenous infusion at 10 mL/hour. Increase the infusion rate by 10 mL/hour every 30 minutes to a maximum rate of:
        - ☐ 30 mL/hour for patients weighing 40–50 kg
        - ☐ 40 mL/hour for patients weighing 51–74 kg
        - ☐ 50 mL/hour for patients weighing ≥75 kg
    - Continue the infusion until the full 50 micrograms (one bag) has been administered.
    - Measure blood pressure and heart rate every 15 minutes for 2 hours, then every 30 minutes thereafter.
    - If the patient develops headache, tachycardia (heart rate >100 beats/min), palpitations, hypotension (systolic blood pressure <90 mmHg), nausea, vomiting, or facial flushing, reduce the infusion rate by 10 mL/hour and reassess after 30 minutes. These are dose-related effects and typically resolve promptly with dose reduction.
    - If the infusion is well tolerated on Days 1 and 2, commence subsequent infusions at the maximum infusion rate from Day 3 onwards (Days 3–5).
    - Repeat the infusion once daily for a total of 5 days.

Cauchy Grade 4 – if less than 24 hours since rewarming

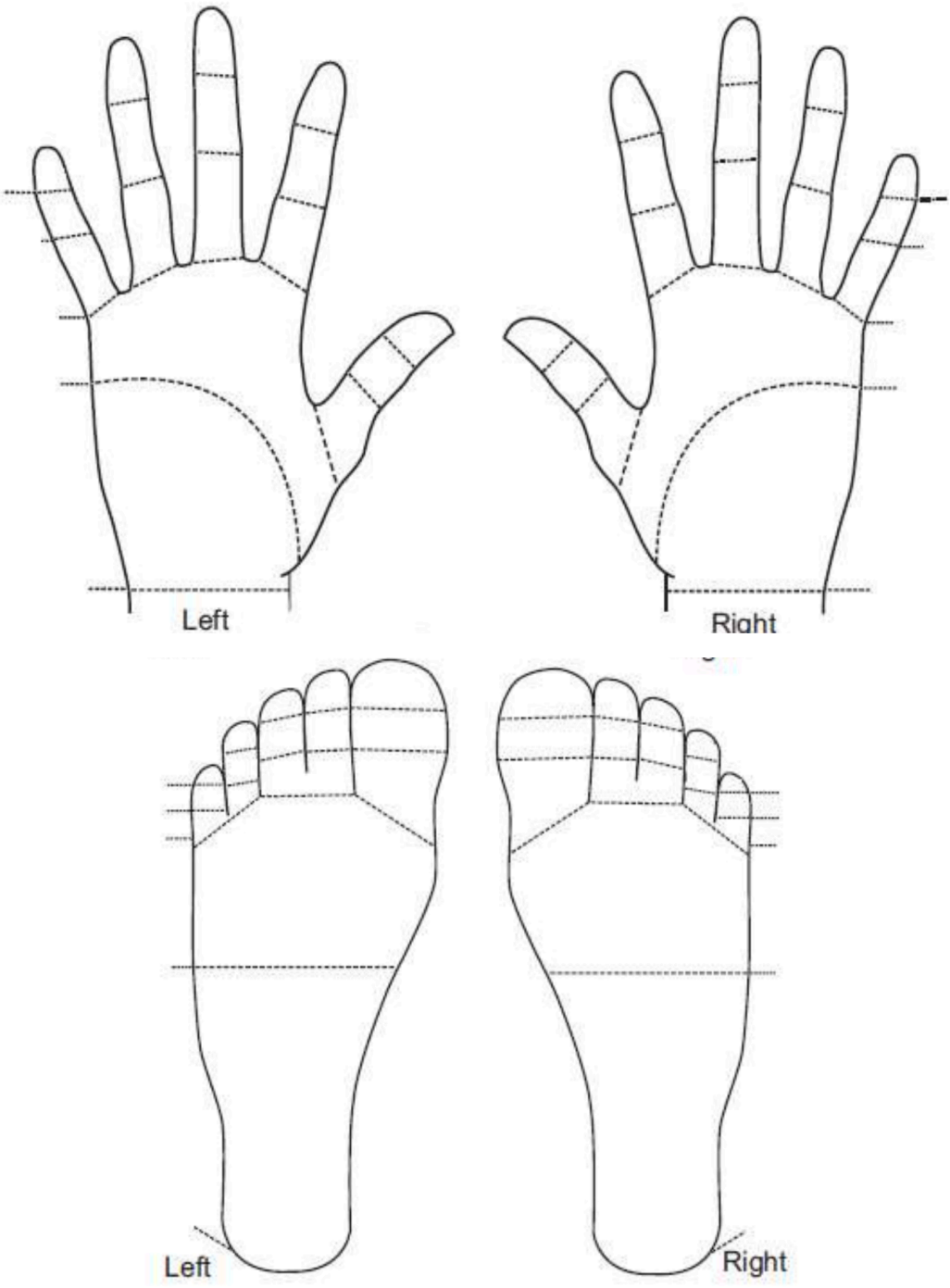
- Initiate thrombolysis as soon as possible within 24 hours of rewarming
- Administer in accordance with local policy and in consideration of any contraindications.



Source: Cauchy E. et al, Wild & Env Med 27, 92-99 (2016)

Grading and Quantification of Frostbite Injury

- Mark the extent of the injury with a dark pen after rewarming. Document skin changes, including any evidence of cyanosis or haemorrhagic blisters.
- This sheet may also be used to monitor progress and any changes over time.



Iloprost additional information

CONTRAINDICATIONS

- Pregnancy, lactation
- Conditions where the effect of iloprost on platelets might increase risk of hemorrhage (e.g. active peptic ulcers, trauma, intracranial haemorrhage)
- Severe coronary heart disease or unstable angina
- Myocardial infarction within the last 6 months
- Acute or chronic congestive heart failure (NYHA II-IV)
- Severe arrhythmias

SPECIAL PRECAUTIONS

- Surgery should not be delayed in patients requiring urgent amputation (e.g. in infected gangrene)
- Iloprost elimination is reduced in patients with hepatic dysfunction and in patients with renal failure requiring dialysis
- In patients with low blood pressure care should be taken to avoid further hypotension and patients with
- significant heart disease should be closely monitored
- Monitor for possible orthostatic hypotension in patients getting up from the lying to an upright position after the end of administration
- For patients with a cerebrovascular event (e.g. transient ischemic attack, stroke) within the last 3 months a careful benefit-risk evaluation should be undertaken
- Currently only sporadic reports of use in children and adolescents are available
- The paravascular infusion of undiluted iloprost can lead to local changes at the injection site
- Oral ingestion and contact with mucous membranes must be avoided. On contact with the skin, iloprost may provoke long-lasting erythema

RECONSTITUTION AND STABILITY

- Ampoules are stored at room temperature
- Each 0.5 mL ampoule contains 50 microgram of iloprost (as iloprost trometamol)
- Dilute 50 mcg (0.5 mL) in Dextrose 5% (D5W) 250 mL bag for a final concentration of 0.2 mcg/mL
- Reconstituted solution is stable at room temperature for 24 hours

COMPATIBILITY

- Compatible with sodium chloride 0.9% (Normal Saline) and 5% Dextrose
- Do not mix with other drugs, compatibility unknown

ADMINISTRATION

- Anaphylaxis precautions: ensure standard emergency medications are immediately available in accordance with local policy.
- Do not handle if pregnant or breastfeeding
- Local site reactions may include redness and pain at the injection site.
- Oral ingestion and contact with mucous membranes must be avoided. If contact with skin occurs, iloprost may cause prolonged erythema.

OTHER

- Dose reduction is required in patients with severe hepatic or renal impairment.
- Elderly alert: Cases of acute pulmonary oedema and heart failure have been reported in elderly patients with advanced arteriosclerosis.

Source: Josianne Gauthier, Clinical Pharmacist, Whitehorse General Hospital, Yukon, Canada