Liquid nitrogen/cryotherapy guidelines

Author: Procare Guidelines Group. Chief Editor: Dr Amanda Oakley, Dermatologist, Hamilton, New Zealand, 3 August 2014.

These guidelines were provided to DermNet New Zealand by ProCare Health Limited, July 2014

Disclaimer

These guidelines have been written for the use in General Practice. No set of guidelines can cover all variations required for specific patient circumstances. It is the responsibility of the health care practitioners using these guidelines to adapt them for safe use within their institutions and for the individual needs of patients.

Definition

Cryotherapy is a minimally invasive procedure that uses an extremely cold liquid or instrument to freeze and destroy abnormal tissue that requires elimination. It is also referred to as cryosurgery or cryoablation.

Scope

Medical practitioners and registered nurses who have been are trained to perform the procedure.

Treatment of malignant skin lesions by cryotherapy is not covered by this document.

Indications for cryotherapy

- Viral warts in older children and adults
- Seborrhoeic keratoses
- Actinic keratoses
- Molluscum contagiosum in adults
- Skin tags*

*Diathermy may be more effective for acrochordons / fibroepithelial polyps

The following skin cancers may be suitable for cryotherapy if performed by a medical practitioner with appropriate training and where the lesion has been identified by biopsy:

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- Small, thin, typical, superficial basal cell carcinoma on trunk and limbs
- Small, typical intraepithelial squamous cell carcinoma on trunk and limbs

**Contraindications to cryotherapy**

- Undiagnosed skin lesions
- Lesion for which tissue pathology is required
- Lesion within a circulation compromised area
- Melanoma
- Previous sensitivity or adverse reaction to cryosurgery
- Patient unable to accept side effects
- Patients with poor circulation
- Unconscious patients
- Young children
- Dark skinned patients

**Precautions when using cryotherapy**

- Areas not recommended for liquid nitrogen application: corners of eyes, fold of skin between nose and lip, skin surrounding nostrils and skin overlying nerves, e.g. sides of digits, below the knee in certain groups (e.g. diabetics, elderly)
- Re-appearance of a lesion previously treated with cryotherapy should be referred for review by medical practitioner
- Recurrent skin cancers after cryotherapy may be more difficult to treat
- Exercise care in patients with history of slow healing or skin infection
- Prolonged freezing may result in scarring – better to freeze lightly and for the patient to return for re-freeze if response is inadequate
- Cryotherapy leaves permanent white marks which may be very unsightly, especially in dark skinned patients
- Cryotherapy may sometimes cause nerve damage and on-going pain in some danger areas where the nerves lie superficially (e.g. sides of the fingers)

**Checklist for cryotherapy**

**Pre-procedure**

- General practitioner should review any lesion where there is uncertainty about the diagnosis or suitability for cryotherapy
- Obtain informed consent

**Prepare equipment/environment**

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• Apply protective eyewear and gloves
• Decant liquid nitrogen into the cryospray or if using a cotton tipped applicator into a non-permeable container
• Cotton tipped applicators have been commonly used but they should only be used for benign lesions, owing to inferior tissue freezing compared to spray techniques

Cryosurgery devices: (left) cotton-tipped applicator, (right) liquid nitrogen spray

Liquid Nitrogen Application

• Hand hygiene
• Select spray tip A to D of the appropriate size for the diameter and thickness of the lesion
• Apply the liquid nitrogen to the lesion for a few seconds, depending on the required diameter and depth of the freeze
• A margin of 1–2 mm is recommended for benign lesions
• A disposable plastic ear speculum (trimmed if necessary) can be used to confine the area of treatment
• Freeze times vary from around five seconds (after the freeze ball appears) for actinic keratoses to 10 or 20 seconds for thicker lesions such as plantar warts or seborrhoeic keratosis
• Two freeze/thaw cycles (with a shorter freeze time) are more effective for thicker lesions such as seborrhoeic keratosis and warts
• For warts (especially plantar warts) removal of keratin by the use of a scalpel blade or prior keratolytic treatment (eg salicylic acid) may improve the response to subsequent cryotherapy
• Cotton tipped applicators should not be re-dipped into the flask; new swabs should be used if more liquid nitrogen is required

Post–procedure

• Periodic cleaning and sterilisation of cryospray nozzles should be performed according to manufacturer's recommendations

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• If the nozzle comes in contact with patient skin then sterilisation by autoclave is required (refer to the practice Infection Control policy)
• Wipe down flask
• Document the lesion and treatment in the patient management system. This includes (but not limited to)
  o Informed consent obtained
  o Specific instructions from the general practitioner
  o Lesion site
  o Duration of liquid nitrogen application
  o Follow-up advice

Inform patient that the treated area:

• May blister within a few hours (clear, red or purple)
• Bleeding may occur (though this is not common)
• The blister shrinks to be replaced by a scab within a few days
• Swelling should settle in a few days
• Healing depends on the site the scab peels off within a week after cryotherapy to facial actinic keratoses, after about three weeks to a similar lesion on the hand, and may cause ulceration on the lower leg and take three months or longer to heal
• A white mark (hypopigmentation) or scar may result

If there are any signs of infection the patient should contact the practice**

**For example, increasing redness of surrounding skin, discharge, increasing pain
Complications and side-effects

Acute

- Oedema
- Pain
- Headache after treatment of facial lesions

Delayed

- Bleeding at the frozen site
- Infection at the site
- Skin discomfort
- Hyperpigmentation (slowly resolves)

Permanent (uncommon)

- Alteration of sensation
- Hypopigmentation
- Hypertrophic scarring
- Hair loss

Safety considerations

- Always ensure the working area has adequate ventilation when handling liquid nitrogen
- Personal protection clothing, including leather gloves, safety glasses and covered footwear, are used when decanting the liquid nitrogen from the storage Dewar flask (storage container) to the cryospray or non-permeable container
- Caution is to be taken when transporting liquid nitrogen
- Liquid nitrogen Dewar flask and cryospray are to be stored in an upright position, in a cool, well-ventilated area away from heavily trafficked areas. These are to be secured to prevent accidental knocking
- To eliminate the potential build of condensation liquid nitrogen dewar flask and cryospray should be stored closed as per manufacturers instruction
- Dewar flasks used for liquid nitrogen storage must have a loose lid or ventilation in the lid to prevent build-up of pressure and consequent risk of explosion