Dispensing Units (Carbon Dioxide, Nitrous Oxide, etc.)

15

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Abstract

Besides for liquid nitrogen (LN), equipment to deliver other cryogens for dermatological purposes is available. Carbon dioxide can be shaped to adapt to lesions or areas to be frozen for cryotherapy and ablation; Carbon dioxide gas dispensing units are available. Nitrous oxide dispensing equipment is in the market. Some units as small as pens, using cartridges of the above gasses compressed are also available. So are units that dispense cryogenic mixtures. A unit that externally cools tips is featured as well.

Key words

Carbon dioxide • Nitrous oxide • Cryogenic mixtures • Gas cylinders

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In addition to the LN, carbon dioxide based equipment is available. Carbon dioxide snow could give good results eliminating benign lesions and small superficial carcinoma. Equipment intended to target internal lesions in gynecology; oral surgery and ophthalmology using nitrous oxide is rarely used in dermatology. The technique and use of probes for nitrous oxide surface freezing is somewhat similar to the LN one.

Nitrous Oxide Cryosurgical Systems

According to the manufacturer the Wallach LL100® unit gives physicians the fastest freeze and defrost; an exclusive two-trigger design allows for precise control of both freeze and

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defrost. With twice the freezing power of other systems it performs both functions more efficiently. Freeze and defrost only occur when triggered. A light-weight, well-balanced, maneuverable unit provides full view of the target tissue. A gas hose allows for unimpeded surgical movement.

Nitrous oxide cylinders (20 lb.) offer approximately 80 min of freeze time. Cylinders are provided empty and may be filled locally at a medical gas supplier. **A** sturdy rolling cart offers a vehicle for transporting the cylinders.

Per its manufacturer the Wallach WA100B® offers the ideal combination of easy-to-use controls and built in safety features. It uses the powerful LL100 two-trigger freezer for nitrous oxide. Freeze and defrost only occur when triggered and can be stopped instantly. A console-mounted switch must be activated to permit gas to flow into the LL100 and a color-coded gauge provides gas pressure reading at a glance. The temperature indicator gives cryosurgeons unparalleled control and efficiency during procedures. Precise readout of tip temperature on thermocouple tips are displayed. The depth of freeze can be read using an independent hypodermic thermocouple. Audible freeze timer starts when freezing temperature is reached and records the total time the tip is actually freezing.

Large selection of reusable, sterilizable cryotips with disposable plastic shields are available for the LL100 and WA1000B Cryosurgical Systems (Fig. 15.1), offering safety and convenience. Disposable plastic shields act as insulator to prevent the tip from adhering to tissue in unwanted areas. The shield also assures proper attachment of the tip by serving as a positive stop, provided tabs on shield are correctly fitted into grooves on the metal tip.

Fig. 15.1 WA1000B Cryosurgical Console System

Carbon Dioxide Cryosurgical Systems

Per the manufacturer, the Frigitronics® Cryo-Plus™ System has everything needed to perform cryosurgery procedures, from excellent thermoconductivity to temperature and pressure gauges. Monitoring the actual tip temperature with every freeze assures an adequate freeze with each treatment (Fig. 15.2). The Cryo-Plus System features interchangeable probes with safety pressure seals. All probes can be autoclaved.

Wallach LLCO2 Cryosurgical System

Fast freeze and defrost. The LLCO2 is specifically designed to handle the challenges posed by carbon dioxide, a gas, liquid and solid within a narrow temperature range. Freeze and defrost only occur when triggered. Light weight, well balanced and maneuverable the unit provides

Fig. 15.2 Frigitronics® Cryo-Plus™ System

full view of the target tissue. The gas hose allows for unimpeded surgical movement. Cryotips can be changed at any time without venting. A large selection of highly conductive reusable, sterilizable cryotips and disposable plastic shields are available. The LLCO2 system is designed differently due to the properties of the gas.

Handheld Delivery Systems for Liquid Nitrous Oxide

Nitrous oxide units just a bit larger than a fountain pen exist. Some are cylindrical, accept a twist-in cartridge of nitrous oxide inside, and feature a button that when depressed releases the gas, which then travels out through interchangeable tips of different widths. The described units are to be held perpendicular to the lesion when used, and the tip should practically contact it during therapy because it is the liquid phase of nitrous oxide that is the coolant. Once inserted a cartridge can hold charge for up to 3 months without use. Examples below.

Miltex® CryoSolutions™

Miltex® CryoSolutions™ complete set including unit with standard 1 mm wide tip, one cartridge (23.5 g), metal pin (which acts as a fulcrum to insert cartridge), a user manual, and plastic case. Replacement Cartridges (23.5 g N2O), Pack of four or ten, and Tips including a standard 1 mm wide glass tip and dermatology 2 mm, 3 mm, and 4 mm wide glass tips are available. Per its manufacturer, this innovative yet simple device allows the clinician to pinpoint the treatment site for rapid freezing (−127 °F) and efficacious destruction of unwanted tissue. CryoSolutions™ is a convenient, in-office treatment for either or superficial malignant lesions. It does not necessitate repeated freeze-thaw cycles since the extreme cold of the liquefied nitrous oxide is delivered directly onto the treatment site. Difficult lesions, such as plantar warts, may require more than a single application. An "average" application time of 6 s for a single lesion would provide approximately 50 treatments per cartridge – an economical patient care product (Fig. 15.3).

Fig. 15.3 Miltex® CryoSolutions™

The CryOmega™

This 'Disposable Cryosurgical Device', per its manufacturer, provides clinically effective direct application of liquid nitrous oxide in a convenient, and economical device (Fig. 15.4). Delivers a continuous, direct spray of nitrous oxide (−89 °C) to treatment site. With a lower operating temperature compared to canister-based systems it provides clinically effective freezing with pinpoint precision. Simple, low-cost, hassle-free operation. Operators are instructed to activate the internal 16 g cartridge once and the disposable device is ready for use. No need for additional accessories or replacement cartridges. Thirty to 45 5-second sprays per device. Difficult lesions may require longer treatment.

Fig. 15.4 CryOmega

CryoProbe™

Per it's manufacturer, this is an innovative, efficient and portable cryosurgical device, which treats benign skin lesions with pinpoint accuracy using disposable nitrous oxide cartridges. The gas is applied to the tissue by the spray from the applicator tips, varying in the range of 1–15 mm. As it easily adapts to every lesion regardless shape or size, only abnormal tissue will be treated avoiding collateral damage to adjacent tissue. The CryoProbe™ is FDA cleared as a Class ll device and can only be sold to physicians (Fig. 15.5).

CryoPen™

The CryoPen Surgical System® features "pen-point" precision, consistent effective freeze temperature ensured by using the temperature indicator, and simple non-technique dependent procedure. Per the manufacturer, CryoPen uses a state-of-the-art, linear compression cooling technology that does not require handling of dangerous cryogenic gases and liquids. In addition, the CryoPen reduces the risks of serious burns. It also makes cryosurgery safer and easier for office staff. Plus, the treatment has a minimal scarring and no need for anesthetic (Fig. 15.6).

Fig. 15.5 The CryoProbe™. *Blue* applicator for 1–3 mm applications, *white* applicator for 2–5 mm applications, *green* applicator for 4–8 mm applications, *yellow* applicator: 7–15 mm applications

Fig. 15.6 The CryoPen Surgical System®

Dermapen CryoTM

Per its manufacturer, this device uses a very precise jet of highly compressed liquefied nitrous oxide to destroy benign lesions, and penetrate up to 1 mm per 5 s of application, making it an extremely versatile machine, treating anything from extremely superficial sunspots to lesions up to 5 mm in depth. The applicator tips facilitate to target the treatment on the lesion and protect the surrounding healthy skin (Fig. 15.7).

Fig. 15.7 Dermapen Cryo™