# Cryosurgery in Otolaryngology*

Pages with reference to book, From 183 To 186

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## Abstract

Cryosurgery was used in 100 cases with various lesions in the ear, nose and throat over a period ranging from early 1980 to the end of 1981. It was found to be a safe, convenient and can be done under a local anaesthetic in the out-patients department. Vasomotor Rhinitis was the commonest indication for cryosurgery in our series. Satisfactory results were also obtained in cases of Epistaxis, Haemangiomas and Leukoplakia. It did not prove useful in malignant lesions (JPMA 32:183, 1982).


## Introduction

Cryotherapy is the application of temperatures below freezing point to tissues, resulting in injury and subsequent cell death. The principle was first introduced by Arnott in 1851 when he irrigated superficial tumours with ice cold brine solutions. Later liquid nitrogen was used in an improved process by Cooper and Lee (1961). Lewis and Cahan treated five tumours of the Glomus Jugulare successfully with cryosurgery in 1967. The cryoprobe was put to a more extensive use by Holden (1972) and Ozenberger (1973).

The changes seen in the tissues after cryotherapy are first rupture of the cell membrane followed by intracellular dehydration, protein denaturation and disruption of cell metabolism causing local ischaemia and micro-thrombosis (Holden, 1973).

The required temperature for cell death is -20°C. (Karja et al., 1975). Further lowering the temperature does not increase the lethality to the cells. Cooling should be carried out rapidly and then the tissues be allowed to thaw slowly. Repitition of the freeze-thaw cycle makes the therapy more effective. Adjusting the probe temperature and the application time controls the width of the cryolesion.

The macroscopic changes seen after cryotherapy are hyperaemia, congestion and inflammation. This is followed by definite necrosis and slough formation. The slough separates leaving a clean granulating area which heals rapidly with little or no scarring.

## Material and Methods

The instrument used was Frigitonies CM73 with Nitrous Oxide to provide temperatures upto a minimum of -89°C. The working is based oil the Joule Thomson Principle where the rapidly expanding gas passing through a narrow aperture brings about the cooling effect. Six interchangeable screw-on-probes were handy for selection (Figure 1 and 2).

*Fig.*1 : Cryo Apparatus with Interchangeable Probes.

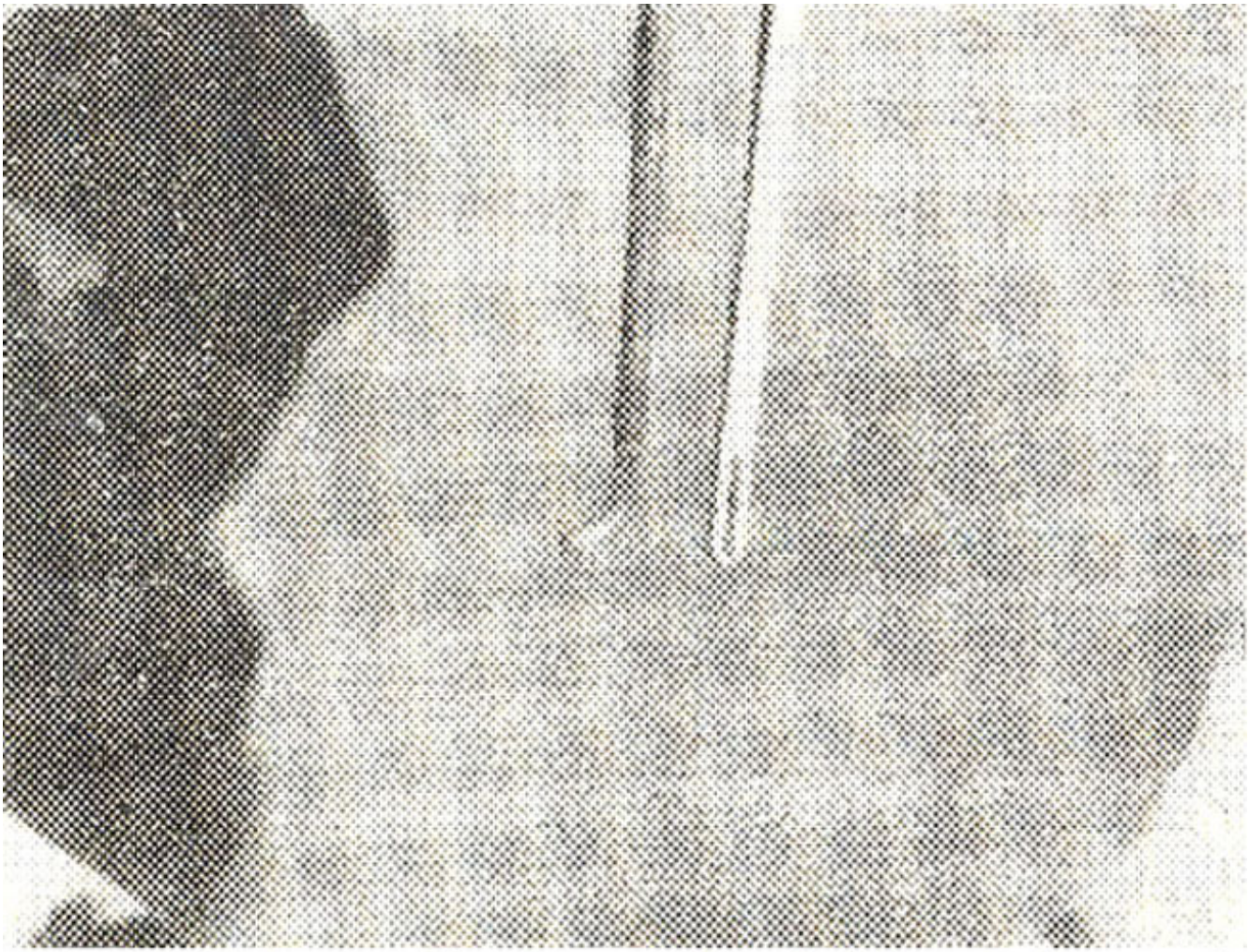

*Fig.* 2: Side on Probe on Left Hand, Curved Probe on Right.

Hundred cases were selected for cryotherapy of which 96 were out-patients. The anaesthetic used was 4% Lignocaine and Vasomotor Rhinitis was the commonest condition (Table I).

Table I

Indications for Cryotherapy

| | | |
|---|---|---|
| 1. | Vasomotor Rhinitis .. .. | 39 |
| 2. | Haemangiomas .. .. .. | 10 |
| 3. | Epistaxis .. .. .. | 18 |
| 4. | Leukoplakia .. .. .. | 11 |
| 5. | Papillomas .. .. .. | 5 |
| 6. | Carcinomas .. .. .. | 3 |
| 7. | Mucous Cysts .. .. .. | 3 |
| 8. | Granulation Tissue .. .. | 5 |
| 9. | Adhesions .. .. .. | 3 |
| 10. | Aphthous Ulcers.. .. .. | 3 |
| | Total: | 100 |

**Results**

**Vasomotor Rhinitis**

The side-on probe (Bicknell, 1979) was applied for a period of 30 to 60 seconds to both inferior turbinates in 39 patients with nasal blockage. 27 cases responded to the first therapy. Ten patients required a second application, whereas one required 3 and one 4 sittings.

**Epistax**

The second commonest condition in 18 patients, all children, was bleeding from Littles Area. The initial treatment in these cases of which eight came with profuse bleeding was local therapy. Cryotherapy Was carried out in the quiescent phase. The probe was applied for 30 to 50 seconds and a single session gave a satisfactory response with no recurrence (Fig. 3).

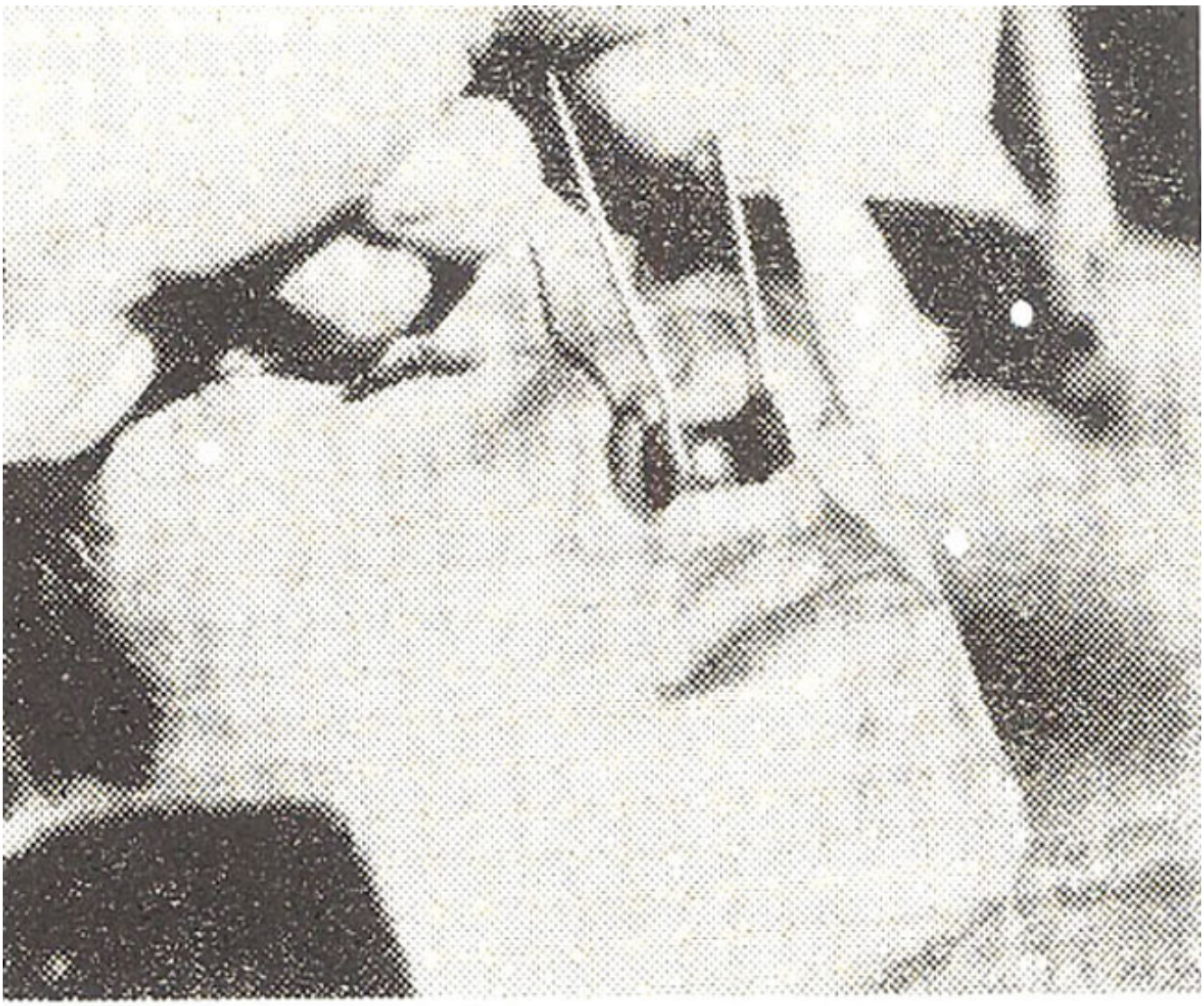

*Fig.* 3: Cryolesion of Right Littles Area soon after Therapy.

**Leukoplakia**

11 cases with leukoplakia underwent cryotherapy. Application time was one minute and repeated sessions were necessary in 10 patients, which gave a satisfactory result (Table II).

Table II

Cryotherapy for Leukoplakia

| *Time of Application in seconds* | *No. of cases* | *No. of Application in each patient* | *No. Success fully Treated* |
|---|---|---|---|
| 30-60 | 1 | 1 | — |
| | 3 | 2 | 3 |
| | 7 | 3 | 7 |

**Haemangiomas**

10 patients with small or medium size haemangiomas located in various parts of the head and neck were treated with cryosurgery (Fig. 4, Table III).

# Table III

## Cryotherapy for Haemangiomas

*Haemangiomas*
(10 *Cases*)

| *No. of cases* | *SITE* | *No. of treatments* | *No. success fully treated* |
|---|---|---|---|
| 1 | Zygoma | 3 | 1 |
| 1 | Conjunctiva | 2 | 1 |
| 1 | Temple | 1 | 1 |
| 2 | Upper Lip Mucosa | 2 | 2 |
| 1 | Tongue | 1 | 1 |
| 1 | Cheek Mucosa | 1 | 1 |
| 1 | Mandible | 5 | — |
| 2 | Neck | 2 | 2 |

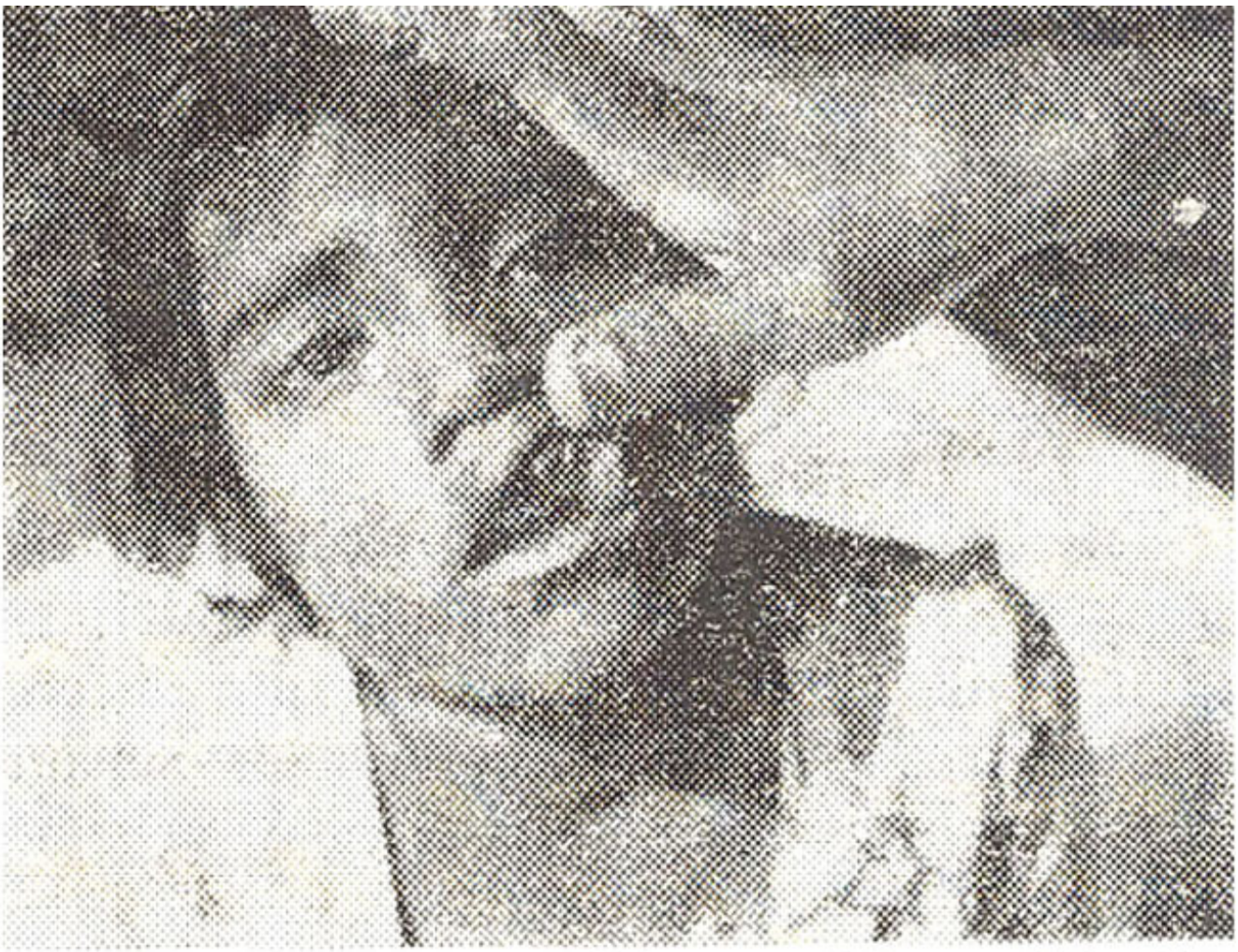

*Fig.* 4: Haemangioma Mucosa Upper Lip for which two Applications were needed.

Repeated applications were required in one patient only.

**Miscellaneous Lesions**

19 patients having mucous cysts, nasal adhesions, aphthous ulcers and papillomas (Table V)

# Table IV

## Cryotherapy for Carcinoma

| *No. of cases* | *Diagnosis and SITE* | *No. of applications in each patient* | *Success fully treated* |
|---|---|---|---|
| 1 | Adenocys Tic Ethmoid | 6 | — |
| 1 | Squamous Pharynx | 4 | — |
| 1 | Cheek | 5 | — |

## Table V
### Cryotherapy for Miscellaneous Lesions
### 19 Cases

| *No. of cases* | *Diagnosis and SITE* | *No. of treatments in each case* | *No. success fully treated* |
|---|---|---|---|
| 3 | Mucous Cyst | 1 | 3 |
| | *Granulation Tissue* | | |
| 1 | Septal Perforation | 1 | 1 |
| 1 | Lower Jaw | 1 | 1 |
| 3 | Tracheostomy | 1 | 3 |
| 3 | Nasal Adhesions | 1 | 3 |
| 3 | Aphthous Ulcer | 1 | 3 |
| | *Squamous Papilloma* | | |
| 2 | Nose | 1 | 2 |
| 3 | Mouth | 1 | 3 |

were treated successfully with cryotherapy.

**Discussion**

In our series of 100 patients, Vasomotor Rhinitis showed the most satisfactory response to cryotherapy. The side-on probe which is insulated, was found to be very safe as it protects the nasal septum on the other side. Similar observations were made by Bicknell (1979). Earlier Tullegrass (Holden, 1972) and silicone (Ozenberger, 1973) have been used to save the nasal Septum.

Good results in cases of leukoplakia treated with cryosurgery have been reported by Poswillo (1976) and Goode and Spooner (1971). Sako (1972) had a recurrence rate of 20% in his series of 60 cases.

Eleven of our patients showed an excellent response, but the recurrence rate could not be recorded as follow up compliance was poor.
Good healing and palliation in eleven out of thirty cases of malignancy was reported by Holden and McKelvid (1972) .In our series the cancer cases did not respond well probably due to the advanced stage of the disease presenting for treatment.

## Conclusion

The application of low temperatures in the modern form of cryosurgery, is a simple and safe procedure. It should be utilized in Otolaryngology, being convenient for the patient and surgeon, it is also highly effective.

## References

1. Arnott, J. On the treatment of cancer by regulated application of anaesthetic temperature. London, Churchill 1851.
2. Bicknell, P.G. (1979) Cryosurgery for alletgic and vasomotor rhinitis. J. Laryngol. Otol., 93:143.
3. Cooper, I.S. and Lee, A.S. (1961) Cryostatic Congelation; a system for producing a limited, controlled region of cooling or freezing of biologic tissues. T. Nerv. Ment. Dis., 133:259.
4. Goode, R.L. and Spooner, T.R. (1971) Office cryotherapy for oral leukoplakia. Trans. Am. Acad. Ophthalmol. Otolaryngol., 75:968.
5. Holden, H.B. (1972) Cryo surgery in ENT practice. J. Laryngol. Otol., 86:821.
6. Holden, H.B. Cryosurgery, in recent advances in otolaryngology, Edited by Joselem Rasome, et al. London, Churchill-Livingstone, 1973.
7. Holden, H.B. and McKelvic, P. (1972) Br. J. Surg., 59:709.
8. Karja, J., Jokinen, K. and Palva, A. (1975) Experiences with cryotherapy in otolaryngological practice. J. Larvngol. Otol., 89:510.
9. Lewis J.S. and Chan, W.G. (1967) Cryosurgical management of glomus juglare tumours. Laryngoscope, 77:912.
10. Poswillo, D.E. Electro surgery and cryosurgery, in Scientific Foundations of Dentistry. Edited byCohen, B. and Kramer, L.R.H. London, Heimemann, 1976, p. 630.
11. Ozenberger, J.M. (1973) Cryosurgery for the treatment of chronic Rhinitis. Laryngoscope, 83:508.
12. Lewis, J.S. and Chaan, W.G. (1967) Cryosurgical management of glomus juglare tumours. Laryngoscope, 77:912.
13. Sako, K., Marchetta, F.C. and Hayes, R.L. (1972) Cryotherapy of intraoral leukoplakia. Am. J. Surg., 124:482.