Role of Cryotherapy in the Management of Cervical Ectropion: A Comprehensive Review

I. Thara[1*], C. Pavithra [1], J. Vanitha[1], Dr. K. Thirumala Naik[2]

1* Pharm D. Intern, Department of Pharmacy Practice, Krishna Teja Pharmacy College, Tirupati, Andhra Pradesh, India.

1. Pharm D. Intern, Department of Pharmacy Practice, Krishna Teja Pharmacy College, Tirupati, Andhra Pradesh, India.
2. Associate professor & Head clinical preceptor, Krishna Teja Pharmacy College, Tirupati, Andhra Pradesh, India.

ABSTRACT:

Cervical ectropion, also known as columnar epithelium on the vaginal portion of the cervix, is one of the common benign conditions that occur in women of reproductive age. Although generally asymptomatic, symptomatic CE can cause painful symptoms such as vaginal discharge, itching, dyspareunia, and post-coital bleeding, and could potentially increase the risk of infection with HPV and cervical dysplasia. Cryotherapy is inexpensive and minimally invasive, and widely used for symptomatic CE. Double-freeze cycle of liquid nitrogen at extremely low temperatures in liquid nitrogen freezes the affected tissue and destroys ectopic epithelium. Cryotherapy is easy, well-tolerated, and may be performed without anesthesia and on an outpatient basis. There are published studies that show a high efficacy rate of up to 98% for resolution of ectropion with symptom relief of 95% in the treated patients. General side effects include cramping and copious vaginal discharge and, in general, resolve spontaneously over weeks. Other complications that include cervical stenosis and infection are unusual but can occur with more significant outcomes. Cryotherapy remains a treatment of choice because of high success rates and minimum side effects and it is very inexpensive, therefore highly advantageous in low-resource settings, where the accessibility of more advanced treatments may be limited. More advanced cases or lesions far in the cervical canal of cases may not be adequate enough to be treated through cryotherapy; however, it is usually effective for most women who experience symptomatic cervical ectropion.

Key words: Cervical ectropion, Cryotherapy, Cervical dysplasia, Liquid nitrogen, Vaginal discharge, post-coital bleeding, Minimal invasive treatment.

INTRODUCTION:

Vaginal discharge is one of the most common and distressing symptoms for women that irritates physically, embarrasses sexually and scares mentally.

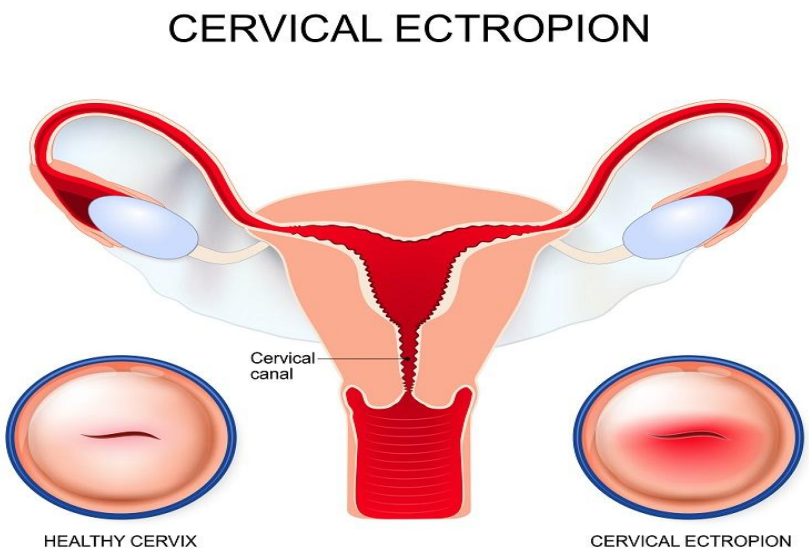

Figure 1.1: Describes the Healthy cervix and cervix with ectropion

Cervical ectropion (also known as cervical erosion) is a common hormone dependent benign condition characterised by an inflammation in columnar epithelium (Endocervical columnar mucosal layer) exists on the vaginal portion of the cervix, replacing the normal stratified squamous epithelium usually found outside the external ostium associated with chronic or recurrent symptoms of cervicitis. The exposed columnar epithelium looks red because of the blood vessels just below the surface. This condition has many designations in medical terminology: ectropion, erythroplakia, macula rubra and erosion.

CE can be symptomatic/asymptomatic. If symptomatic, it can cause prolonged physical and psychological distress for women due to chronic or recurrent vaginal discharge and discomfort. Long-term exposure of everted columnar epithelium to the vaginal environment leads to squamous metaplasia, this rapid cellular generation can be a suitable site for inoculation of HPV during intercourse.

Between the 1920s and 1970s, gynaecologists widely performed ablation of ectopic epithelium in an attempt to diminish the symptoms of chronic cervicitis and/or reduce susceptibility to lower tract infection or dysplasia. Not all factors involved in the pathogenesis of cervical ectopy are known but there is an association with the action of estrogen.

EPIDEMIOLOGY:

Cervical ectropion (CE) seen in almost all women of reproductive age with an estimated prevalence between 17-50% globally. In adolescents, the prevalence can be as high as 80%. Benign CE is a relatively common finding among fertile women. It has higher prevalence during pregnancy and also among users of estrogen-based contraceptives.

SYMPTOMS:

- Increased Vaginal Discharge (Leucorrhoea)
- Vaginal Itching/Pruritus
- Dyspareunia
- Suprapubic Pain
- Post-Coital Bleeding

DIAGNOSIS:

- Routine Pelvic Examination
- Pap Smear Screening (Co-Test).

MANAGEMENT:

There are several treatment options for symptomatic cervical ectropion,

- Cryotherapy,
- Electrocoagulation
- Microwave Therapy

Among these treatment options, cryotherapy is a commonly used treatment, because it is easy to perform, inexpensive, does not require anaesthesia, and has few side effects.

CRYOTHERAPY:

Over the past 200 years old treatment has evolved from generalized application such as hydrotherapy to specific focal destruction of tissue that is today's cryotherapy**.** Pharmacotherapy alone is sometimes ineffective and ablation of the ectopic region of cervix remains the final option for management.

Cryotherapy is a simple, cost-effective, and safe outpatient treatment for ablative goals. It is an old and common procedure first introduced in 1960. Providing a good quality of life for women is essential to have a healthy population. Besides elimination of the symptoms, it can have considerable benefits for the prevention and treatment of CIN (Cervical Intra-Epithelial Neoplasia). It was introduced to gynaecology in

the late 1960s to treat cervical intraepithelial neoplasia and it is proven to be a reliable treatment modality, with limited side effects and morbidity. The method is used to treat cervical, vaginal, endometrial and vulvar lesions. Anaphylactic reactions during treatment, severe pain, cramps or severe bleeding during or after cryotherapy requiring further treatment.

Various methods have been proposed for damaging the transformation zone. It consists of a handle device with a metal probe on its tip and a flexible connector that transmits carbon dioxide or nitrous oxide to the probe to freeze and ruin the transformation zone. Cryotherapy is controlled destruction of tissue by freezing. It is a double freeze technique in which the tissue is frozen for a period 5 of 3 minutes thawed for 5 minutes and refrozen for 3 minutes. In order to achieve hypothermia, liquid nitrous oxide is forced through a small hole at a pressure range of 750-900 pounds per square inch (psi). This produces a very low temperature at the surface of the probe due to the Joule-Thompson effect. The temperature at the probe tip can range from -65◦c to -85◦c. Cell death occurs secondary to crystallization of intracellular water at -20◦c to 30◦c. Liquid nitrogen is by far the most popular in current use. Its popularity is due to low temperature achievable (-197 C), which makes it suitable for both benign and malignant lesions. Nitrous oxide is favoured as storage has no problems; cylinders are not easily portable. Cryotherapy is cheap, easy and safe treatment suitable for both hospital and office-based practice. Cryotherapy causes some discomfort. Most of the feel a sensation of cold and a little of cramps and sometimes sense of warmth spread to upper body and face. Cryotherapy is not adequate treatment if abnormal cells are high in the cervical canal. The treatments currently available are electrocoagulation, cryo-cauterization, laser cauterization and drug treatment. Patients are treated on an outpatient basis and efficacy for cauterization is around 90%. Cryotherapy is the use of low temperatures locally or generally in medical therapy. Its goal when using extreme temperatures is to destroy cells by crystallizing the cytosol. In cervical cryotherapy, cells destroyed by freezing are shed. afterwards in a watery discharge.

Liquid nitrogen as well as carbon dioxide has been used in cervical cryo-cauterization. The technique has been acceptable to women and practitioners; it is a low-cost technique and can be easily adapted to local needs. Cryotherapy is the most preferred technique for treatment, and its effectiveness for both symptomatic improvement and the disappearance of ectropion has been demonstrated improved symptoms for abundant leucorrhoea, contact bleeding, recurrent cervicitis, and pelvic pain and that in 98.4% of the patients, ectopy completely disappeared after cryotherapy.

PROCEDURE OF CRYOTHERAPY:

The cervix was visualised using a Graves speculum in the lithotomy position. The appropriately sized cryoprobe for the ectropion was placed on the cervix, and the gas was allowed to flow through the channels

to the metal tip of the cryoprobe. The double-freeze cryotherapy procedure was performed using a cryotherapy unit (Brymill Cryogenic Systems, CRY-AC (800) 777-2796 Ellington, CT 06029, USA), and liquid nitrogen was used as a refrigerant. The cervix was frozen continuously for 120 seconds and allowed to thaw spontaneously; following the double-freeze technique, the same freeze–thaw cycle was performed a second time. In places with limited resources that lack infrastructures for management of CIN like colposcopy or LEEP, cryotherapy has been recommended as a simple and safe method. In those conditions after application of acetic acid on the cervix, acetowhite spots are distinguished by visual inspection and destroyed with cryotherapy simultaneously.

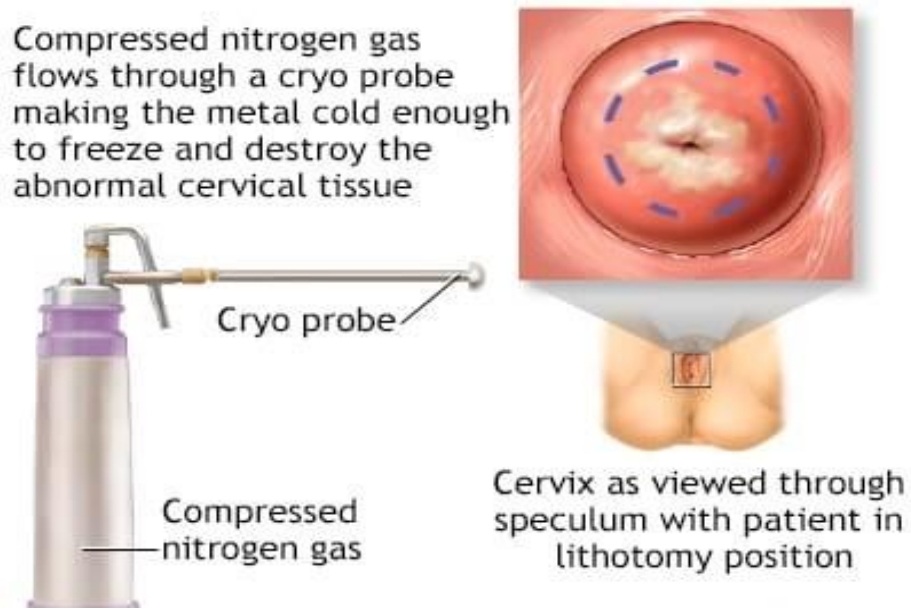

Figure: Explains the procedure of cryotherapy

MECHANISM OF CRYOTHERAPY:

The physical effect of cryotherapy is known as **"direct cell injury"**. At freezing temperature, water crystallizes in the extracellular spaces and in turn leads to cellular dehydration called as **"solution-effect injury".** Cells shrink and membranes and cellular components are damaged. During thawing, ice melts, the extracellular environment rapidly becomes hypotonic allowing water to enter within the damaged cells, causing cell membrane disruption. Lowering the temperature weakens cell scaffolding and causes mechanical damage, pH decrease, consequently lead to metabolism failure. Vascular stasis and cellular anoxia followed by hyper perfusion and oxidative damage occurs due to vasoconstriction and vasodilatation due to freezing and thawing and eventually results in cell sloughing.

FACTORS INFLUENCING CRYOTHERAPY

- ✓ The number of freeze/thaw cycles

- ✓ Holding (duration of freezing)
- ✓ The mass of frozen tissue
- ✓ The nature of tissue: Cancer cells are very cryo-sensitive
- ✓ The distance from the probe.

POSSIBLE SIDE EFFECTS ASSOCIATED WITH CRYOTHERAPY:

- Temporary hot flushes
- Abdominal cramps
- Leucorrhoea
- Mild pain
- Mild bleeding or spotting
- Malodorous excessive discharge

Table: Describes the advantages and disadvantages of cryotherapy

ADVANTAGES	DISADVANTAGES
• Serious injuries or complications are rare • It is quick and easy, short time • No hospitalization needed • No anaesthesia is required • Simple and inexpensive equipment • There is minimal blood loss due to a sealing off effect on the frozen tissue • It is the less expensive than Laser • There is no need of electricity	• Discharge which is usually profuse, watery and may last for 2-3 weeks. • Uterine cramping i.e. pain, often occurs during the cryotherapy but rapidly subsides after treatment, may last for 36 hours. • Vasomotor reaction in form of flushing, dizziness, headache, can occur during procedure.

• Cervical stenosis or rate of pregnancy is not altered • It can be used in cases of blood dyscrasias.	• Due to friability of treated area, contact bleeding may occur so intercourse should be avoided for 3-4weeks. • Vaginal and vulval burns.

COMPLICATIONS:

- Severe Local Cervical Infections
- Pelvic Inflammatory Disease
- Functional Cervical Stenosis

DISCUSSION:

Cervical ectropion is an extremely common benign condition in women of childbearing age, causing symptoms that may include vaginal discharge, pruritus, dyspareunia, and postcoital bleeding. Even though the majority of the cases are asymptomatic, symptomatic cervical ectropion needs treatment to eliminate annoying problems and reduce the chances of HPV infection and cervical dysplasia. Cryotherapy is the current treatment of choice because it is simple and less expensive with minimum invasion. High success rates, including up to 98% ectropion resolution and as high as 95% with relief of symptoms, suggest the efficacy of liquid nitrogen application by freezing the ectopic epithelium destined for elimination. Tolerable and painless and anesthesia-free treatment with mild cramping and watery discharge resolved 2-3 weeks post-procedure. Other benefits of cryotherapy include low costs, applicability at outpatient levels, and few complications. The best is appropriate for poor settings with very few medical technologies available. It cannot be applied in cases where the lesions are beyond the cervical canal. Therefore, other types of treatment should be considered, including LEEP or conization in severe cases. Although grave complications are rare, contact bleeding and vasomotor responses may be found. Cryotherapy can be selected over laser treatment and electrocautery, as it is cheaper with minimal complications and can be more accessible to use because of its applicability. Therefore, cryotherapy is an effective, safe and inexpensive treatment with minor risks but high success rate for symptomatic cervical ectropion. Their use is an integral part of the essentials but must never be used by chance in considerations of their grade and localization.

CONCLUSION:

A crucial component of effective and safe as well as economically feasible treatment in patients with symptomatic cervical ectropion would be cryotherapy, which generally enjoys high rates of success-up to

98 percent of these conditions are eradicated, accompanied by marked diminishment of clinical signs in close to 95% of subjects-as the simple technique is usually innocuous for minor complications occurring through watery discharge and very modest cramps and rare instances of major sequelae. When cryotherapy is contrasted with alternative options like laser therapy or electrocoagulation, it offers the benefits of lower costs, fewer complications. There is less utilization and benefit when cervical ectropion has progressed; such cases should be managed either with LEEP or conization. Nonetheless, cryotherapy can be said as one of the cornerstones for managing cervical ectropion if it is an accessible and not complicated case.

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