Non- pharmacological management for mastalgia: A narrative review

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Abstract

Mastalgia is the most common symptom experienced by the females at least for once in a life time. The aetiological factors classify the pain into cyclic, acyclic and extramammary mastalgia. Management for the mastalgia is advised followed by thorough assessment in the cases of recurrent pain. We conducted a review on various non-pharmacological treatment options for breast pain using the search engines such as PubMed, Google Scholar and Cochrane review bases. The ideal treatment options for the mild cases are reassurance, avoiding caffeine, lifestyle changes and advising for supportive sports brassiere whereas intervention of the non-pharmacological and supplemental therapies are advisable to moderate to severe cases of breast pain.

Introduction

Mastalgia is defined as the pain arising from the breast tissue. It is the most common symptom experienced by the females particularly in the reproductive age. It is mentioned that 70% of women present with mastalgia at least for once in a life time[1]. The presenting complaint may be unilateral or bilateral. The classification of mastalgia is as follows; Cyclical and non-cyclical ones which are associated with the menstrual phases. The other two are categorized under extra mammary causes of the chest wall pain and the shoulder pain.

Cyclic mastalgia

In this breast pain is felt at the regular intervals during the menstrual phases. The reasons for the pain are cited due to the hormonal changes. The most often experienced symptoms include pain, swelling and tenderness. It is differentiated from the other types as the pain sensed is bilateral. Intensity of the pain is more before and during the menstrual cycle and it gradually reduces over a period of 5 days.[2]

Non – Cyclic mastalgia[3]

This type is recognized by the sign of unilateral or bilateral felt pain. The aetiology of the non- cyclic mastalgia is due to underlying pathology like injuries, surgery, infections, breast cysts or fibroadenoma.[4] Localized sharp and burning breast pain is noticed. This is usually seen in the age groups between 30 – 50 years.

Extra mammary mastalgia

It is a radiating pain originating from the heart, lungs, chest wall or oesophagus. This type of pain is usually due to the exertion of the chest-wall muscles.

The management of the cases is based on the type of pain and the associated symptoms obtained by the clinical examination. Providing reassurance to the patients is by prescribing the NASID's. Recurrence of pain is subjected to further evaluation to rule out the malignancies. Studies mention that the prevalence of mastalgia both cyclic and acyclic as 47.33%, where 88.7% had cyclic mastalgia and only 9.89% had acyclic mastalgia[5].

This paper reviews the various non- pharmacological interventions for the management of the mastalgia and an update to the current management protocols.

Factors associated with Mastalgia:

1. **Hormonal**

   The change in the hormonal levels of oestrogen and progesterone are determined as the contributing factors for the mastalgia. Increase in the oestrogen and decrease in progesterone which occurs in cyclic manner among the fertile age group women i.e., during the menstrual cycle onsets the symptoms of pain, tenderness and swelling[6]

   A study conducted by S Watt-Boolsen Et al, found that positive correlation between oestradiol and prolactin, that higher prolactin levels in patients with cyclic mastalgia compared to slightly fibroadenotic breasts. Prolactin is considered a central factor in the eliciting of cyclical mastalgia.[7]

   The use of oral contraceptive pills is another cause which creates imbalance in the hormonal levels in the body. As a side effect the individual develops breast pain and tenderness. In one study 16% of women reported breast pain as a side effect of oestrogen therapy and 32% reported the same in cases of combined hormonal therapies[8]

2. **Lifestyle**

   Diet-Coffee is the most often described risk factor for the breast pain. In a study by Ader et al. with 874 patients, caffeine and smoking were associated with cyclic mastalgia **[9].** High dietary intake of fats is also mentioned as the cause of mastalgia. However, the mechanism is not clear but it is hypothesized that reducing dietary fat alters the parameters that may be related to mastalgia, including the mammographic breast density[10]. Boyd et al. also suggested that a low-fat diet prevents breast pain[11].

   Stress- Multiple studies mention about the relation between mastalgia and psychological factors. A study on Relation between Mastalgia and Anxiety in a Region with High Frequency of Posttraumatic Stress Disorder shows; the level of anxiety was significantly higher in the cases with mastalgia than in the controls. Another study by Susan Et al, supports the rationale that all breast pain groups were more anxious and depressed, somatised more and recalled a higher incidence of emotional abuse in comparison with breast lump patients**[12].**

Smoking- Several studies have established an evidence of mastalgia in association with smoking. A case- control study on Effects of sagging breasts and other risk factors associated with mastalgia shows**;** smoking at least 10 cigarettes a day, and drinking alcohol at least once a week were found to be important factors that increased the risk of mastalgia[13].

The above study mentioned also concludes; high BMI and sedentary lifestyle as the predisposing factors for the breast pain.

3. **Cancers**

The predominant factor to be ruled out in the cases of the non-cyclic mastalgia is malignancy. As most of the breast cancers present with the symptom of pain. As study on Mastalgia and breast cancer: a protective association? Mentions; women who experienced breast pain in our patient population were less likely to be diagnosed with breast cancer than women who did not complain of breast pain, regardless of age, and of other breast cancer risk factors. Further investigation is needed to confirm the diagnosis after the onset of pain.[14]

Non- pharmacological Management

In regard to the higher prevalence rate of cyclic mastalgia compared to non – cyclic, it is suggestive to have non – pharmacological interventions to be prescribed as the clinixcal studies conducted provide rationale with significant results in combating mastalgia.

Herbology

Evening Primrose oil (EPO)

Oenothera biennis is the generic name of the evening primrose. As the flowers of this plant bloom in the evening, hence the name. The oil that is extracted from the seeds of *O. biennis* is found to be useful as a therapeutic approach in the management of atopic eczema, schizophrenia, and rheumatologic conditions.[15]

The mechanism of action is through the two omega 6 fatty acids; linolenic acid and γ-linoleic acid. These essential fatty acids are involved in the synthesis of prostaglandins. The presence of this essential fatty acid allows the synthesis of anti-inflammatory substances such as 15-hydroxy-eicosatrienoic acid and prostaglandin E1[16] **.**

A study conducted among 1015 patients admitted to Acibadem Breast Clinic between january 2015 and march 2018 to understand the efficacy of evening primrose oil in patients with mastalgia proved; The therapeutic efficacy of EPO on mastalgia was significantly higher than with paracetamol ($p < 0.001$). Factors significantly affecting the efficacy of EPO treatment were hormone replacement therapy (HRT), IUD-with-levonorgestrel, iron deficiency, overt hypothyroidism, and Hashimoto thyroiditis ($p < 0.01$)[17].

A clinical trial on Management of cyclical mastalgia in oriental women: pioneer experience of using gamolenic acid (Efamast) in Asia carried out on 66 women by prescribing 6 EPO capsules (240 mg/d GLA) and followed up for a period of 6 months shows an overall useful response rate of 97% was observed at 6 months. Side-effects were found in 12% but all were insignificant.[18]

A few studies demonstrate the efficacy of the EPO is higher when prescribed as adjuvant to the Centchroman, danazol, vitamin e and Piroxicam gel.

Vitex agnus- castus(VAC)

Chaste tree the common name of Vitex *Agnus castus* L. is a deciduous shrub native to Mediterranean Europe and Central Asia. The use of fruit extracts from these in the management of pain is well documented[19]**.**

Evidence suggests, cyclic mastalgia in some women is associated with the stress induced hyper-prolactinemia. Vitex works through prolactin-suppressive effect by dopaminergic properties of clerodadienols which bind to recombinant DA2-receptor protein and suppressed prolactin release from cultivated lactotrophs as well as in animal experiments.[20]

A multicentric noninterventional trial conducted among 1634 patients suffering from premenstrual syndrome (PMS) to investigate the efficacy and tolerance of Vitex validated; After a treatment period of three menstrual cycles 93% of patients reported a decrease in the number of symptoms or even cessation of PMS complaints. Analysis of frequency and severity of mastodynia as the predominant symptom revealed that complaints still present after 3 months of therapy were mostly less severe.[21]

A recent meta-analysis on 17 RCT's and 8 reviews in the year 0f 2020 on vitex agnus castus for the treatment of cyclic mastalgia confirms; VAC was effective in relieving breast pain intensity and lowering the increased serum prolactin level in reproductive age CM patients (18–45 years) with or without premenstrual syndromes. Typical dosage was 20–40 mg/day with a treatment duration of 3 months.[22] More high-quality clinical trials are needed to strengthen the evidence base.

Matricaria chamomilla

Chamomile scientifically known as *Matricaria chamomilla* is predominant in the Mediterranean region. Medical ingredients are extracted from the dry flowers of chamomile are of therapeutic value used for many human ailments such as hay fever, inflammation, muscle spasms, menstrual disorders, insomnia, ulcers, wounds, gastrointestinal disorders, rheumatic pain, and hemorrhoids. used for many human ailments such as hay fever, inflammation, muscle spasms, menstrual disorders, insomnia, ulcers, wounds, gastrointestinal disorders, rheumatic pain, and hemorrhoids.[23]

one of chamomile's anti-inflammatory activities involve the inhibition of LPS-induced prostaglandin E(2) release and attenuation of cyclooxygenase (COX-2) enzyme activity without affecting the constitutive form, COX-1.[24]

A study on Effectiveness of Matricaria chamomilla (chamomile) extract on pain control of cyclic mastalgia: a double-blind randomised controlled trial demonstrates, there was also significant reduction in mastalgia in chamomile group than placebo group. It also concludes chamomile is effective for women with moderate mastalgia.[25]

A study by Farangis Sharifi etal, establishes; Consumption of Chamomile capsule 100 mg or MA 250 mg three times a day seems to be more effective than mefenamic acid in relieving the intensity of PMS associated symptomatic psychological pains.[26]

Nigella sativa Seed Oil

The shrub nigella is available in the middle eastern and Mediterranean regions. The use of Nigella as a therapeutic agent is since the ancient times. The fruits of this herb consist of dark black coloured seeds from which the oil extraction is made. The wide spread biological activities include bronchitis, asthma, diarrhoea, rheumatism, diabetes and skin disorders.[27]

The biochemical action of the shrub is very well understood and it varies as per the disease. The possible mechanism of analgesic is through thymoquinone, unsaturated fatty acids, and carvacrol which are the constituents of seed oil. Activation of μ and κ opioid receptors by thymoquinone and inhibition of the cyclooxygenase enzyme through unsaturated fatty acids alleviates the pain.[28]

A Randomized, Triple-Blind, Active, and Placebo-Controlled Clinical Trial conducted to understand the Effectiveness of Topical Nigella sativa Seed Oil in the Treatment of Cyclic Mastalgia confirms; Mastalgia was relieved about 10–15 min after application of the N. sativa seed oil or diclofenac, with the result that it did not interfere with the usual daily activities.[29]

Mirmolai et al. (2017) tried to evaluate the effectiveness of Nigella Sativa in cyclic mastalgia. Intervention group were served with 10 ml of Foeniculum vulgare equivalent of two tablespoons daily and Placebo group with 10 ml parafn or two tablespoons of parafn. The results showed a significant difference in VAS evaluation ($p = 0.002$) and no significance for McGill evaluation leading us to conclude that Nigella Sativa syrup is effective on cyclic mastalgia.[30]

Nutrition

1.Vitamin E

The antioxidant fat soluble supplement has been used as a treatment for cyclic mastalgia over a long period for its multiple biological activities such as prostaglandin inhibition, prevention of oxidation of unsaturated fatty acids etc, a randomized double-blind clinical trial to understand the effect of flaxseed oil on the severity of pain and breast nodularity was investigated against vitamin E. This study showed that flaxseed oil and vitamin E both could be effective in breast pain-relieving and decreasing nodularity with minimal side effects in contrast with the baseline.

A study by Sousan Parsay et al., to know the therapeutic Effects of Vitamin E on Cyclic Mastalgia demonstrates; Based on the above-mentioned results, we found a dramatic outcome in 2 and 4 months use of Vit E compared with a placebo. However, the therapeutic effects were negligible, whether a course was administered for 2 versus 4 months. Accordingly, we have concluded that the accepted protocol for the management of mastalgia , should initially be the prescription of a course of Vit E for 2 months after an exacting evaluation of the patient has provided adequate assurance of a lack of serious disease or malignancy. Our study shows that this may lead to the subsiding the symptoms in approximately 70% of patients complaining of breast pain. For the remaining 30% who may return with continuing breast pain complaints, EPO (an over-the-counter supplement consisting of unsaturated fatty acids and Vit E) could be prescribed as the next step in treatment and, if the results are unsatisfying, Danazol will be recommended as a second choice[31]

2. Dietary Fat

Breast density and the dietary fat intake have shown correlation in the symptoms of mastalgia. Reduction in the intake of fat to less than 20% of total calorie intake per day has shown proven benefits in the patients of breast pain as this results in the reduction of hormones which causes the symptoms[32].

3. Caffeine

Methylxanthine (Caffeine) present in coffee, tea, chocolate and cola, have an association with breast symptoms of pain, tenderness, nodularity, has been reported. However, the clinical studies have shown inconsistent and significant results. A study by D N Ader et al., moking, caffeine consumption and perceived stress were associated with mastalgia with odds ratios of 1.52, 1.53 and 1.7, respectively.[33]

Effect of Caffeine Intake on Mastalgia establishes; failed to show any association of discontinuation of caffeine and decrease in the pain intensity in our patients.[34]

Reassurance

Recommending the non – pharmacological treatments and the oral reassurance by providing in depth explanation on the non-neo plasticity and the possible causes for the symptoms as per the evaluation of the history is considered as the best approach in 80% cases with mastalgia while the 20% cases need the require the treatment.

A study conducted in 1999 to evaluate the effect of reassurance in the treatment of mastalgia provides rationale; the authors verified a success rate of 70.2% with reassurance. When evaluating the intensity of symptoms, reassurance was effective in 85.7% with a mild form of mastalgia 70.8% with moderate form and 52.3% with severe form of mastalgia.[35]

Physical activity

Sedentary lifestyle is one of the leading causes of many diseases. Absence of the physical activity and the intake of the high calorie diet support the rationale behind the onset of symptoms of mastalgia due to the imbalance in the hormonal activity and accumulation of the fatty tissues increasing the breast density. A base line study was conducted to evaluate the effects of exercise on mastalgia using the Short-Form Health Survey (SF-36) questionnaire before and six weeks after study. Serum cytokine levels were also collected and analysed. It shows, the sensory component of breast pain questionnaire and visual analogue scale values significantly improved via exercise in only exercise group ($p = 0.012$ and $p = 0.016$). There was no significant difference between groups in serum levels of cytokines.[36]

Sports Brassiere

Movement of the breast tissue vertically during the regular chores and maximum downward deceleration force on the breast without proper external support is the cause of pain in the breast tissue**.**

Hadi, M. S. A. A. has conducted a study to know whether Sports Brassiere; is a solution for mastalgia? In these 100 women were prescribed 200mg of danazole per day and the rest 100 women were instructed to wear sports brassiere during their regular activity for a period of 12 weeks. With a response rate of 100% the women who received danazole had only 58% relief of symptoms and 42% experienced side effects whereas patients with external support had 85% relief of symptoms with a little discomfort in the beginning.[37] V. Rosolowich et al also agree that the use of a well-fitting bra that provides good support should be considered for the relief of mastalgia**.**[38]

Balneotherapy

Balneotherapy is a treatment modality under hydrotherapy in which n natural mineral or thermal waters (e.g., mineral baths, sulphur baths, Dead Sea baths) are used for the treatment purposes. Multiple studies were conducted to know the efficacy of water treatment to reduce the pain have shown significant improvement. This efficacy actually is based on hydrodynamic principles and water triggered physiological changes including the body's density, gravity, buoyancy, hydrostatic pressure, viscosity, and thermodynamics. Thus, water immersion increases cardiac output, muscle blood flow and oxygen availability. It also effects pain perception and skin sensory nerve endings are stimulated.[39]

A randomized control trail conducted to comprehend the efficacy of balneotherapy in mastalgia agrees the above rationale with its results; Baseline total breast pain scores (BPS) and cytokine levels were similar between the groups. Total BPS ($p = 0.001$), VAS ($p = 0.039$) and PPI ($p = 0.004$) in the balneotherapy group significantly improved after therapy. TNF-α level in the balneotherapy group also significantly decreased after therapy ($p = 0.003$).[40]

Conclusion

The patients complaining about mastalgia should be thoroughly assessed and clinically evaluated to rule out the malignancies and to obtain definitive aetiology for the onset. Reassurance, avoiding caffeine, lifestyle changes and advising for supportive sports brassiere are the prime line of management options proven to be effective. Intervention of the non-pharmacological and supplemental therapies are advisable to moderate to severe cases of breast pain.

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