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INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 11, November 2025, pp : 1934-1938

e-ISSN : 2583-1062
Impact Factor : 7.001

BRIEF REVIEW ON: GYNECOMASTIA: PATHOPHYSIOLOGY, PHARMACOLOGY AND TREATMENT

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DOI: https://www.doi.org/10.58257/IJPREMS45165

ABSTRACT

Gynecomastia (GM) is characterized by enlargement of the male breast, caused by glandular proliferation and fat deposition. GM is common and occurs in adolescents, adults and in old age. The aim of this review is to discuss the pathophysiology, etiology, evaluation and therapy of GM. A hormonal imbalance between estrogens and androgens is the key hallmark of GM generation. The etiology of GM is attributable to physiological factors, endocrine tumors or dysfunctions, non-endocrine diseases, drug use or idiopathic.

Keywords: Breast. Gynecomastia, Surgery, Adolescent.

1. INTRODUCTION

Gynaecomastia is a common problem in the male population, particularly in young adults, with a reported prevalence of up to 36%.[1] The term refers to a benign female-like enlargement of the male breast resulting from an increase in ductal tissue, stroma and/or fat.

Enlarged breasts can cause anxiety, self-consciousness and embarrassment, functional problems and psychosocial discomfort and fear of malignancy. It is not surprising, therefore , that gynaecomastia is the most common cause for seeking medical advice for a breast condition in men. The two treatment options are medical therapy and surgical removal. Medical therapy is probably most effective during the active proliferative phase of the condition . If a trial of medical treatment is unsuccessful or the gynaecomastia has been present for several years, then surgical treatment is likely to be required.1,2,3

Gynecomastia is a medical condition characterized by the enlargement of breast tissue in males. It's a common condition that can occur in one or both breasts, and its severity can vary from mild to severe.

Causes

1. Hormonal imbalance: Changes in estrogen and testosterone levels can contribute to gynecomastia.

2. Puberty: Many boys experience temporary breast enlargement during puberty.

3. Aging: Hormonal changes during aging can lead to gynecomastia.

4. Medications: Certain medications, such as anabolic steroids and some antidepressants, can cause gynecomastia.

5. Health conditions: Certain medical conditions, such as hypogonadism or liver disease, can increase the risk of gynecomastia.

Symptoms

1. Breast enlargement: Swelling or enlargement of breast tissue.

2. *Tenderness*: Breast tenderness or pain.

3. *Asymmetry*: Uneven breast size or shape.

Treatment Options

1. Observation: Monitoring the condition to see if it resolves on its own.

2. Medication: Medications that balance hormonal levels or reduce breast tissue.

3. Surgery: Surgical removal of excess breast tissue.

If you're experiencing symptoms of gynecomastia, it's essential to consult a healthcare professional for proper evaluation and treatment.4,5,6,7

PATHOPHYSIOLOGY:

It is well known that male breast tissue contains. protein recep- tor for estrogens and androgens.6,8,9 Whereas estrogens stimulate the proliferation of the mammary ductules, androgens, on the ccontrary .the inhibit the

process.10,11 A hormonal imbalance the between these factors is the key hallmark for GM generation.12-14 The estrogen/androgen imbalance may be attributable to increased levels of free in the estrogens secreted by the testes or adrenal glands,

extraglandular aromatization of estrogen precursors, decreased estrogen degradation, exposure to estro- gen-like chemicals or exogenous estrogens and use of drugs that cause displacement of more estrogen than androgen from sex hormone-binding globulin (SHBG).10,13 On the other side, the imbalance may result from decreased androgen production in the testes, increased binding of androgens (relative to estrogens) by SHBG, altered androgen metabolism , drug-induced displacement of androgens from their receptors and androgen receptor defects.8,9,10,11.

Gynecomastia is a medical condition characterized by the enlargement of breast tissue in males. It can occur in one or both breasts and may be caused by hormonal imbalances, certain medications, or other underlying health conditions.

Key Aspects

1. Prevalence: Gynecomastia is a common condition affecting males of all ages.

2. Causes: Hormonal imbalances, puberty, aging, medications, and certain health conditions.

3. Symptoms: Breast enlargement, tenderness, and asymmetry.12,13,14.

Gynecomastia is caused by an imbalance of the hormones estrogen and testosterone, leading to the enlargement of breast glandular tissue in males. The pathophysiology involves either an increase in estrogen's effects or a decrease in androgen (testosterone) effects, which can happen through increased estrogen production, decreased testosterone production, or an increased sensitivity to estrogen in the breast tissue. This hormonal imbalance can be due to physiological factors like puberty, or pathological causes such as liver disease, certain medications, or tumors. 15,16,17

Hormonal imbalance

- **Increased estrogen:**

Conditions that lead to a higher level of estrogen or an increase in the conversion of androgens to estrogen can stimulate breast tissue growth.

- **Decreased testosterone:**

A lower level of testosterone, the hormone that typically inhibits breast tissue growth, shifts the balance in favor of estrogen.

- **Altered ratio:**

The primary issue is an altered estrogen-to-androgen ratio in the body, which favors estrogen's stimulatory effect on the breast tissue.

Causes of imbalance

- **Physiological:**

- **Puberty:** The relative increase in estradiol compared to testosterone can cause temporary gynecomastia during puberty, which usually resolves on its own.

- **Aging:** Older men may experience hormonal changes that can lead to gynecomastia.

- **Pathological:**

- **Liver disease:** Conditions like cirrhosis can impair the liver's ability to metabolize estrogen, leading to higher circulating levels.

- **Kidney failure:** Chronic kidney disease can lead to a hormonal imbalance that contributes to gynecomastia.

- **Tumors:** Tumors of the adrenal glands, pituitary gland, or testes can disrupt hormone production.

- **Medications:**

A significant number of cases are caused by drugs that have estrogen-like activity, inhibit testosterone synthesis, or block androgen action.

- Examples include certain heart medications (like spironolactone), anti-ulcer drugs (like cimetidine), and illicit drugs like heroin and marijuana.

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Pubertal GM

Mild degrees of pubertal GM generally appear at 13 or 14 years of age,last for 6-12 months and then that of spontaneously regress in 95% of the cases.13 The glandular enlargement may be asymmetric and tender The hypertrophy may reach severe proportions. lead to an effeminate appearance in boys. Such as the occurrences may alter self-perceptions , especially in the sexual sphere.18,19,20.

Endocrine tumors

Benign testicular tumors (Sertoli or Leydig cell tumors) may secrete estradiol. Secondary suppression of LH levels interferes negatively with testosterone synthesis. The elevated estrogen levels raise the in to serum concentration of SHBG, which preferentially binds testos-terone, thereby lowering the free testosterone levels.21,22,23,24.

ETIOLOGY OF GYNECOMASTIA:

Gynecomastia is caused by a hormonal imbalance between estrogen and testosterone, often triggered by natural hormonal fluctuations during puberty or aging, as well as certain medical conditions like liver disease or hyperthyroidism. Other causes include the use of certain medications, alcohol, and illicit drugs, and some types of tumors.

Endocrine dysfunctions

Severe hyperthyroidism increases serum SHBG. Since estradiol binds less avidly to SHBG than does testosterone, there appears to be an increase in the ratio of free estradiol to free testosterone, thus resulting in clinically evident GM in 10 to 40% of the patients.primary gonadal failure as a result of testicular trauma, chemotherapy, mumps, orchitis and leprosy can cause GM by lowering the serum testosterone levels, inducing elevation of LH and stimulating the remaining Leydig cells to secrete estrogens.12 klinefelter syndrome is a chromosomal disorder (47 XXY kary-o type) associated with hypogonadism and infertility; in these men, GM is seen in almost 70%. The reason why the presence of an extra X chromosome is linked to GM is unclear.14,38 Male pseudohermaphroditism with Morris syndrome (testicular femi-.nization) is often associated with normal female breast appearance due to gonadal estrogen production.33 Low testosterone and elevated LH levels indicate primary hypogonadism. Findings of low testosterone levels with normal LH assays denote secondary testicular failure.25,26.

Non-endocrine diseases

The chief sex hormone abnormalities in cases of liver cirrho-sis are decreased serum testosterone levels and increased estradiol levels.39 The mechanisms that cause liver cirrhosis to lead to GM in a small percentage of cases have yet to be elucidated. The causes are probably multifactorial. Men with chronic renal failure are often hypogonadal, with defects in testicular steroidogenesis.12 Many of these men develop GM.

2. TREATMENT

General measures

If the GM is slight, without noteworthy psychological repercussion and the appropriate work-up does not reveal any underlying disease and only shows weight loss, reassurance and periodic follow-up visits (every 3-6 months) are recommended. Reassurance is widely regarded as the safest and most reasonable form of treatment, given that the condition is usually self-limiting and asymptomatic.for mild enlargements in pubertal boys, the simplest therapy approach is verbal explanation and reassurance regarding the signs and symptoms. Reassurance should be based on full and authoritative explanations about the common transient hormonal imbalance at this age, the natural involution of the condition and the absence of later sexual and fertility effects.

PHARMACOTHERAPY :

With the assumption that there is a high possibility that the GM may spontaneously regress, the decision on when to treat is often difficult .33-53 However, medical treatment is likely to be beneficial if implemented during the early proliferative phase, before the glandular structure has been replaced by stromal hyalinization and fibrosis. Androgens, antiestrogens and aromatase inhibitors have been tested for GM treatment with some success. Danazol is an antigonadotropic drug with a weak androgen effect that acts to counterbalance the stimulatory effects of estrogen. A daily dose of 200-600 mg may provide effective control over the symptoms.58,59 The side effects are acceptable. Dihydrostestosteron heptanoate, which does not undergo peripherals aromatization, was used in one study for a small number of pubertal cases with excellent results.

Surgical correction

GM of long duration is unlikely to regress spontaneously and may often progress to dense fibrosis and hyalinization. So far, for long-standing symptomatic GM, medical therapy is less likely to be effective because the stroma is mostly fibrotic. Traditionally, surgery has been the mainstay of therapy in such cases, as well as for men for whom medical therapy fails, is not tolerated or is declined, or for whom tissue removal is preferable for cosmetice reasions .14 Even during adolescence, surgery may be the preferred option . In some cases, denial of cosmetic correction or procrastinate in providing this may create an additional unnecessary burden on an already overloaded psyche.

Grade I

In grade I, the enlargement is caused solely by glandular proliferation without adipose accumulation. Surgical correction involves mammary adenectomy performed by a semicircular inferior periareolar incision. Liposuction is not required.

Grade II

Grade II GM is characterized by excessive glandular tissue and local adiposity, with the NAC above the inframammary fold. In these cases, liposuction and surgical excision must be combined in the same operation .

Grade III

In grade III, the operation begins with liposuction and is followed by glandular excision with periareolar removal of the tissue . It is necessary to detach the excess skin to obtain a good chest silhouette. The surgical planning is undertaken bearing in mind the necessity to preclude the stigma of big scars. For the final appearance, it is always preferable for the scars to be restricted to the periareolar area. As a routine, a double-circle incision is performed over the skin, therapy making it possible to remove the epithelial tissue from an annual portion of skin that is as large as needed for each case . Because the epidermis has been removed, round-black suturing is done, which gives rise to a circumferential periareolar scar.56,86

Grade IV

The hallmarks of grade IV GM are severe ptosis and a large amount of redundant skin. One of the techniques for reduction mastoplasty is used to remove gland and skin and flatten the chest outline.Inverted T-shaped resection, with NAC migration using superior or superior-medial dermic pedicles, similarly to the procedure for mammoplasty in women, may be used. Other technique such as those with horizontal or oblique incisions can also be use.

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