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NAVIGATING THE MAZE OF FIBROADENOMAS: FROM ETIOLOGY TO SURVEILLANCE - A REVIEW

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ABSTRACT

Fibroadenomas are benign masses that are present in breast. It is a painless, unilateral, non-cancerous breast tumor that is a solid, not fluid-filled, lump. It occurs commonly in women between the age of 14 to 35 years but it can be found at any age. Fibroadenomas are a marble-like comprising of both epithelial and stromal tissues and are less common in post-menopausal women. These breast lumps are often variable in size. Most fibroadenomas may be treated without surgery, but those masses that are symptomatic or increasing in size may require surgery.[1]

Treatment difficulties arise when a teenager is diagnosed with fibroadenoma. Fibroadenoma is rarely malignant, but when a teen's family discovers a breast lump, it might worry and anxiousness the patient and family members. Young adolescents do not receive care for fibroadenomas; however, when treating fibroadenoma in adolescents, it is important to clearly convey the advantages and disadvantages of available treatments, reassure the patient that the mass is probably benign, and determine whether excision or observation and ongoing monitoring are necessary.A suspected fibroadenoma should be observed for one menstrual cycle and imaging tests can be performed to confirm its presence. Ultrasound is the most common method, while mammograms are used for women over 35. If confirmed, the mass is further examined for size and shape. If the mass is small and not growing, surgical excision may be performed. Juvenile and giant fibroadenomas are typically treated surgically.Patients who have a complicated fibroadenoma may have a small increase in their risk of breast cancer. Calcified breast tissue may be seen in this kind of lesion. However, the majority of the time, it is benign and safe, and removal may not need surgery.

As to the review, fibroadenoma is the most prevalent benign breast illness. The majority of patients initially complained of a painless lump in the upper outer quadrant of their breasts. A key factor in the diagnosis of benign breast disorders is histopathology. The origin, pathophysiology, diagnosis, treatment, and management of the same are also highlighted in this review. Sustained research endeavors aim to enhance our comprehension and management of fibroadenomas, providing enhanced comfort and customized attention for those impacted.

Keywords: Lump, non-cancerous, mammography, glandular, fibroadenoma

Introduction

A fibroadenoma is a solid breast lump which is not a cancer. A fibroadenoma starts often at adolescence to adult, between ages 15 and 35. But it can be found at any age in anyonewho has periods.

A fibroadenoma often causes no pain and feels movable. It can feel firm, smooth and rubbery. A fibroadenoma is usually round in shape. It moves easily within the breast tissue when touched.[1]

On young women, fibroadenomas are common breast lumps. Unlike a breast tumor, it does not grow and spread to other tissue, it remains on breast tissue. It is a benign, non-cancerous breast tumor. It is still unknown what exactly causes fibroadenoma. Hormones like estrogen may play a role in developing the tumor. Taking contraceptives at young age has been related with higher risk. Itmay get shrink during menopause and grow during pregnancy.

The diagnosis of fibroadenoma is done by clinical examination, imaging and non-surgical tissue biopsy. Imaging of the tumor includes mammography, combined with ultrasound inolder women, and ultrasound alone in younger women as mammography is usually not needed in young women. Tissue biopsy is done to determine the size, shape by either fine-needle aspiration or core biopsy, is the most accurate means of establishing the diagnosis.

Breast lesions which are benignhas to be taken more attention and care because of theirhigh prevalence, itseffect on women's everyday life and alsobecause of its cancerous potential of some histological types. It was studied thatfrom August 2014 to August 2016,210 cases of histologically diagnosed benign lesions of the breasts were carried out in the Pathology Department, at tertiary care teaching hospital with attached peripheral hospitals in a city of western India and the results was that out of 210 benign lesions, 201 (95.7%) were found in females and 9 (4.3%) were found in males. The most benign breastlesion was fibroadenoma which was 77.62%, also followed by fibrocystic disease (4.3%) andgynaecomastia (4.3%).[1]

HISTOPATHOLOGY

The history of fibroadenoma is known well. A hugeproportion of fibroadenomas revert spontaneously. Someshrink and others remain unchanged, while some grows bigger.It is said that about40% of fibroadenomas reduce its size over a periodof twoyears. Approximately 10% go away on its own each year. Most fibroadenomas stopgrowing its size after they attain 2 to 3 cm. Coarse calcification maydevelop when fibroadenoma shrinks in postmenopausal women. Fibroadenomas may grow very fast during pregnancy, hormonereplacement therapy and also during immunosuppressive treatment.Fibroadenoma mainly occurs in second and third decadeof life. It is a discrete, smooth, mobile (movable) non- tendermass that is usually situated in upper outer quadrant of breast where most breast tissue lies. It is around 1-2 cm in size when discovered first. The average size of tumor is comparatively bigger in our country than in western countries where the size is rarely more than 2.5 cm in diameter.Fibroadenomas are a type of breast cancer that can revert spontaneously, shrinking or growing larger. About 40% of them reduce in size over two years, while 10% disappear annually. Most stop growing after 2 to 3 cm. Postmenopausal women may develop coarse calcification when fibroadenomas shrink. They can grow rapidly during pregnancy, hormone replacement therapy, and immunosuppressive treatment. Fibroadenomas are discrete, smooth, and mobile, usually located in the upper outer quadrant of the breast.Juvenile fibroadenoma refers to those fibroadenomas that occurs in young adults or children and are histologically more cellular whereas Fibroadenoma that attains a size typicallygreater than 5 cmare considered to begiant fibroadenomas.A fibroadenoma is a distinct, well-circumscribed, non-encapsulated lesion with borders that does not infiltrate the adjacent breast parenchyma. The stroma are uniform, hypovascular, and composed of spindle-shaped cells with bland oval to elongated nuclei.[2]

Fibroadenomas are benign tumors in breast ducts, consisting of a bi-cell layer with a myoepithelial layer. The inner glandular layer is composed of cuboidal to columnar-shaped cells with uniform nuclei, supported by an outer myoepithelial layer. Benign alterations can involve the epithelium, calcifications, and lactation changes in pregnancy. Fibroadenomas have two histological growth patterns: intracanalicular and peri-canalicular. In the intra-canalicular pattern, the stroma compresses and distorts the glands into cleft-like spaces, while in the peri-canalicular pattern, the stroma surrounds the glands without distorting them.

Variants of fibroadenomas exist. A myxoid fibroadenoma has a prominent blue-tinged myxoid changes in stroma. Although it is uncommon, some patients with myxoid fibroadenomas can have Carney complex (which is an autosomal dominant disorder characterized by endocrine tumors, skin hyperpigmentation, and blue nevi,

among others). A cellular fibroadenoma has much stromal cellularity than usual. In juvenile fibroadenoma, there is increase in stromal cellularity and a greater degree of epithelial hyperplasia, commonly seen in young girls and adolescents. A complex fibroadenoma has sclerosing adenosis, calcifications, or papillary apocrine changes, and also it is greater than 3 mm in size.[2]

Despite the patterns and its histological variants of the fibroadenomas, this does not change the benign nature of the lesion. Rarely, atypical lobular hyperplasia, ductal carcinoma in situ, lobular carcinoma in situ, and invasive carcinomas can involve a fibroadenoma. Thepatients are treated according to their high-risk, pre-cancer, or cancerous lesions.

History and Physical

Age is one of the most important factors in the incidence of fibroadenoma. Therefore, when obtaining a patient's medical history, age is the most important factor which should be considered.

Family history of breast cancer are significant. Patients that are female who have relatives with breast cancer should be monitored carefully and observed more for malignant features than patients withoutfamily history.

Fibroadenoma occurs more commonly inupper outer quadrant of the breast. On examination, it has these following features:

Non-tender or painless

Mobile

Solitary

Solid lump rapidly growing with rubbery consistency and regular borders.[3]

Fibroadenoma

A fibroadenoma is a lump that occurs within the breast tissue. It causes no pain and can be felt when touched. It feels rubbery and movable. It is a non- cancerous tumor found in breast which is very common on young girls as well as women under 30. It can be found in either one or both breasts.Fibroadenomas can be so small that they can't be felt or they can be big as well. The size of fibroadenomacan be clearly defined and the tumors have a detectable shape. Surgical is very common in adolescents after taking biopsy for the lump.

It is mostly found in upper-outer quadrant of the breast. It is surrounded by glandular, fibrous and fatty tissues. Fibroadenomas develop from the lobules. It is recommended by the doctor to perform proper evaluation of ultrasound analyses and possibly tissue sampling in order to make a proper diagnosis of fibroadenoma. Unlike lumps from breast cancer, fibroadenomas are identify as it isa easy to move, with clearly defined edges.[3]

Etiology

The exact cause of fibroadenoma is still unknown but it is known to be linked with hormonal changes such as estrogen that young girls undergo at the time of puberty and it also happens due to overgrowth of glandular tissue in the breast. It often grows larger during pregnancy and tends to shrink by itself at the time of menopause. It is estimated that 10% of world's female suffer from it once in a lifetime.[7]

Pathophysiology

Hormonal

Fibroadenoma tends to accelerate while pregnancy, which is due to excessive production of female hormones. The tissue stromal and epithelial connective tissues which is both functionally important in the breasts contain receptors for both the estrogen and progesterone.

Genetics

Mediator complex subunit 12 (MED12) gene mutation is also important in the pathophysiologyoffibroadenomas.[9]

Symptoms

It is a solid breast lump that often causes no pain. It is:

Round with distinct, smooth borders

Easily moved

Firm or rubbery

It can be tender

Average size of these lumps is about 1 inch (2.5 centimeters). A fibroadenoma can grow bigger over time.A large fibroadenoma may hurt but most often, this type of breast lump causes no pain. Fibroadenoma can occur in single or both the breasts. It can be single or even appear as multiple fibroadenoma.[11]

Diagnosis

Breast fibroadenoma is noticeable by doing self-exam. After proper evaluation for both the history and physical examination are done thoroughly, the following imaging modalities are performed for the diagnosis of the fibroadenomas.

Mammogram

Mammogram uses x-rays to evaluate the suspicious area of the breast. This imaging diagnostic is often performed for women over 35 years of age. Mammography is often not used for young women as they can have dense breast tissue as it makes harder to identify between breast tissue and fibroadenoma. And also risks for mammogram radiation is higher, so it is generally not uses to check for lumps in younger age groups.

In mammogram, fibroadenomas appears as a distinct area apart from other breast tissue, as it is welldefined with smooth round edges.

Breast Ultrasound

Ultrasound of the breast is performed on women under 30 years of age. It uses sound waves to show the images of the inside of the breast. The professional likely will use breast ultrasound to check a breast lump. Ultrasound are used to easily define the size and shape of a fibroadenoma. This test can also show the difference between any solid breast lump and a fluid-filled cyst. An ultrasound causes no pain even though it can cause a little discomfort.

Sometimes, a biopsy maybe required for further investigation of the fibroadenoma.

Treatment and Management of Fibroadenoma

As compared to adult, diagnosis of fibroadenoma for adolescent presents challenges in treatment. Malignancy in fibroadenoma is rare, but discovery of a breast lump in a teenager may cause anxiety and worry in the patient as well as family. Although there is no care for fibroadenomas in young adolescents, considerations of treating fibroadenoma in adolescents include effectively communicating the risks and benefits of treatment options, the mass is most likely to be benign, and need for excision or observation and follow-up.[11]

Management of a suspected fibroadenoma should be observed at least for one complete menstrual cycle, assuming a normal menstrual pattern. If the breast mass still shows, imaging tests can be performed to determine if the mass is consistent with a fibroadenoma. Ultrasounds are commonly used to overview breast masses in adolescents. Mammogram is mainly used for women over 35.

Magnetic resonance imaging (MRI) and mammography are alternative techniques, but are not recommended for use in adolescents due to the density of breast tissue.Continuation of checkups are followed.Fine needle aspiration or core needle biopsy may be done.If a fibroadenoma is confirmed by imaging studies, it is then further looked for its size and shape, and if it occurs to be small and not increasing in size then it may be managed with careful observation and follow-up.Surgical excision of the fibroadenoma may be performed if the mass is rapidly growing. Juvenile fibroadenomas are surgically treated due to rapid growth, while giant fibroadenomas are excised due to size. Excision can be done under local or general anesthesia, with mass size and location guiding incision location and length. Masses involving more than one-third of the breast may require drain placement.Alternatively, MRI-guided ultrasound surgery mayshow good results in adolescents andadults, but these techniques are not widely used.[13]

Postoperative patients should not involve in strenuous activity for 6 to 8 weeks and wear compression vests or sports bras for 4 to 6 weeks to minimize swelling and pain. Patients should be examined around 4 and 8 weeks postoperatively, every 3 months for the next year, biannually for the second year, and then annually. Exams evaluate complications, mass recurrence, and incident masses. Postoperative cosmetic deformity or secondary asymmetry may occur, but reconstructive surgery is typically considered one year post-procedure.

In majority of cases, fibroadenomas does not need no treatment. They tend to shrink and disappear over time, but if the size is large and they are compressing other breast tissues, then they should be removed.

Many females decide against the surgery to get it done or not because the lesions are harmless and involve no long-term risk of malignancy. Surgery also distorts the shape of a breast and size.[13]

Surgery

Doctors might decide to remove the fibroadenoma if it is massive and continues to increase in size and shape.

Indications for surgical intervention include rapid growth, size greater than 2 cm, and patient’s request.

There are 2 surgical procedures that is used to remove a fibroadenoma:

1. Lumpectomy or excisional biopsy: In this procedure, the surgeon removes the fibroadenoma and further sends it to the laboratory for further evaluation.
2. Cryoablation: Surgeons use a cryoprobe to freeze and also to destroy the cellular structure of fibroadenoma. A needle biopsy must be performed before cryoablation to confirm the fibroadenoma.

An interprofessional approach to fibroadenoma is recommended.

Mostly, breast lesions in young women are identified on an incidental breast exam either by the patient itself or the healthcare provider. Even though fibroadenomas are benign lump, sometimes there may be a need to confirm the histology. Healthcare workers including nurse practitioners, doctors should never assume that all

firm, rubbery lesions, lumps are benign. If ever in doubt, it is recommended to get a radiologist or surgeon to perform a biopsy. Missing a malignant breast lesion in a young female or adults can lead to poor outcomes.[16]

Differential Diagnosis

A fibroadenoma can be confused with:

Breast cyst or lump

Breast carcinoma

Phyllodes tumor

Breast lymphoma

Prognosis of fibroadenoma is good because in majority of the case, it is a benign mass which shrinks in size over time.[18]

Complications

Patients with complex fibroadenoma, which may contain calcified breast tissue, may slightly increase their breast cancer risk slightly. But in most cases, it is benign and harmless and may not require surgery to remove.[22]

Conclusion

In conclusion, this review stated that fibroadenoma is the most common benign breast disease. Patients that are present with a painless lump in the upper outer quadrant of the breast, and histopathology is crucial for diagnosing benign breast diseases. This review also highlights etiology, pathophysiology, diagnosis, treatment and management for the same. Ongoing investigations promise to further refine our understanding and treatment of fibroadenomas, offering improved reassurance and personalized care for affected individuals

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