Breast masses are uncommon in adolescents but can cause significant distress to the affected individual. They are usually benign fibroadenomas, intraductal papilloma, or phyllodes tumors. Malignant phyllodes tumors and primary breast cancer are very rare in adolescents but have been diagnosed before. Treatment of benign lesions is usually local excision, whereas malignant lesions usually need complete surgical resection. Chemotherapy and radiotherapy are not recommended in adolescents with breast cancer.

Overview

Benign and malignant breast masses are uncommon in adolescents. Despite being rare, breast masses usually cause significant worry and distress to the adolescent and her family. Breast masses in adolescents are usually benign and are usually fibroadenomas. Malignant breast masses only constitute 0.02 % of the masses identified in adolescents.

<table>
<thead>
<tr>
<th>Pubertal breast development mainly under influence of:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estrogen</strong></td>
</tr>
<tr>
<td>Lactiferous ducts</td>
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</table>

Female adolescent breast tissue is very dense and responsive to hormonal changes. Many breast masses found accidentally.

Epidemiology of Breast Masses in Adolescents

The estimated prevalence of breast masses in adolescents is around 3.2 %. The most common type of breast masses in adolescents is a fibroadenoma and is diagnosed in up
to 95% of the cases.

Malignant breast masses are very rare in adolescent girls but have been reported to exist. Approximately, 0.02% of the identified breast masses in adolescents are found to be cancerous. Phyllodes tumors, primary breast cancer, sarcoma, lymphangioma, hemangioma, and metastatic cancer are some examples of malignant breast masses that can be seen in adolescents.

**Intraductal Papilloma in Adolescents**

**Clinical Presentation of Intraductal Papilloma**

It is the most common cause of non-bloody nipple discharge in an adolescent. Intraductal papilloma can also cause pain. It is important to note the duration and progression of the symptoms. Physical examination of the breast with palpation can express nipple discharge. These benign lesions are usually found in the subareolar area and are usually non-palpable.

**Diagnostic Workup for Intraductal Papilloma**

A cytology exam is indicated when a nipple discharge is present in an adolescent. Ductal cells are usually observed on the cytological examination. Ultrasonography is indicated to identify the cause of the nipple discharge and can be used to visualize the intraductal papilloma. The gold-standard diagnostic tool is a ductogram, but it can be considered as too invasive for an adolescent who is very likely to have a benign condition rather than a malignant lesion.

**Treatment of Intraductal Papilloma**

While intraductal papilloma itself is not a pre-malignant condition, the risk of breast cancer in an adult with the previous history of intraductal papilloma has been shown to be increased. Therefore, the treatment of choice of an intraductal papilloma in an adolescent is local surgical excision.
Phyllodes Tumors in Adolescents

Clinical Presentation of Phyllodes Tumors

These tumors are **cystic lesions that resemble fibroadenomas but with increased stromal content**. The term cystosarcoma phyllodes can be also used to describe the lesions. Patients present with a rapidly growing tumor that is large and painless. A clinical examination might be confusing as phyllodes tumors are difficult to distinguish from giant fibroadenomas.

Diagnostic Workup for Phyllodes Tumors

When the main complaint from the adolescent is a large breast mass, the first diagnostic test would be an ultrasonography. **Ultrasonography can reveal lobulations and heterogeneity without microcalcifications.** Unfortunately, these findings are not specific for phyllodes tumors and their presence is an indication for a core needle biopsy.

Histology Findings in Phyllodes Tumors

The typical picture is that of a fibroadenoma with significantly increased stromal proliferation. It is important to identify the degree of dysplasia and proliferation as grading the tumors has been linked with survival rate. The 5-year survival rate for benign phyllodes tumors is 96 %, whereas it goes down to 74 % for intermediate phyllodes tumors. The survival rate after complete resection of malignant phyllodes tumors is around 66 %.
Treatment of Phyllodes Tumors

The treatment of phyllodes tumors in adolescents is similar to adults, i.e., complete surgical resection. The main difference in treatment between adult and adolescents is the unnecessity for a 1 cm surgical margin.

Fibroadenomas in Adolescents

Clinical Presentation of Fibroadenomas

Fibroadenomas usually present as firm, non-tender well-demarcated masses. The most common site is the **upper outer quadrant of the breast**. The masses can become tender or show cyclic size changes that are related to the menstrual cycle. Breast asymmetry is also a common presenting problem in adolescents. The typical mousy feel of the fibroadenomas, i.e. sliding between the fingers during palpation, is usually observed during the physical examination. The skin overlying the tumors is normal.

Diagnostic Workup for Fibroadenomas

The diagnosis of fibroadenomas in adolescents is easy and is usually based on history and physical examination. If a nipple discharge is present, cytology is indicated. Ultrasonography is the imaging modality of choice for the confirmation of the diagnosis. Mammography is not recommended due to high-density breast tissue.
Treatment of Fibroadenomas

The potential of malignant transformation in adolescents who have fibroadenomas is very low. Therefore, the treatment of fibroadenomas in adolescents can be challenging. When the fibroadenoma is diagnosed for the first time, a follow-up should be arranged to see if the mass disappears after the next menstrual period. If the mass does not disappear, they are small and are not painful, treatment can be mainly observation and follow-up. If the lesions are growing in size, or are associated with tenderness, then surgical excision of the tumors is indicated.

### Clinical follow up
- Most require only clinical follow up

### Surgical excision
- Surgical excision for symptomatic, rapidly growing

### NSAIDs or OCPs
- NSAIDs or OCPs to help pain with hormone-dependent changes

Primary Breast Cancer in Adolescents

Clinical Presentation of Primary Breast Cancer in Adolescents

The incidence of breast cancer in adolescents is 1 in 1,000,000. Adolescents with breast cancer usually present quite late to the clinic and the mass is usually large. Physical
examination reveals a firm, nonmobile mass with poorly circumscribed borders. Nipple discharge and retraction are uncommon in adolescents with breast cancer compared to adults.

Diagnostic Workup for Primary Breast Cancer in Adolescents
The most common type of breast cancer in adolescents is a secretory adenocarcinoma. These tumors are characterized by their cystic appearance on ultrasound with a thick wall. Mortality and nodal metastasis are uncommon with secretory adenocarcinoma. Medullary and inflammatory cancer has been also reported in adolescents and pediatrics. Mammography is not recommended in the diagnostic workup for breast masses in adolescents due to the relatively higher density of the adolescent breast compared to the adult breast. Core needle biopsy is indicated for grading and histological examination.

Treatment of Primary Breast Cancer in Adolescents

**Complete surgical resection** should be attempted in all cases. A complete breast resection might be psychologically traumatic to the adolescent; therefore, reconstructive surgery is also indicated. Axillary lymph node staging is indicated. Ultrasonography should be used to assess the status of the axillary lymph nodes and if no metastasis is identified, then a sentinel lymph node should be obtained during surgery.
The role of **radiotherapy and chemotherapy** in primary breast cancer in adolescents is controversial and might be not needed.

**Metastatic Cancers of the Breast**

Many cancers have been associated with metastatic disease to the breasts. The most common examples are hepatocarcinoma, non-Hodgkin lymphoma, leukemia, and rhabdomyosarcoma. The management of these tumors should also cover the breast metastatic disease if present.

**Management of Breast Infections**

**Mastitis**

- Common in lactating adolescents
- **Group A Strep or Staph Aureus**
- May present with fever alone, then develop into erythematous, confluent painful rash
- Fever is common
- Treat with cephalexin or clindamycin

**Breast abscesses**

- Antibiotics
- Warm compresses
Drainage

References


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