

Quantitative CT Assessment of Gynecomastia in the General Population and in Dialysis, Cirrhotic, and Obese Patients

Eyal Klang, MD, Nayroz Kanana, MD, Alon Grossman, MD, Steve Raskin, MD, Jana Pikovsky, MD, Miri Sklair, MD, Lior Heller, MD, Shelly Soffer, BSc, Edith M. Marom, MD, Eli Konen, MD, Marianne Michal Amitai, MD

Rationale and Objectives: Gynecomastia is the benign enlargement of the male breast because of proliferation of the glandular component. To date, there is no radiological definition of gynecomastia and no quantitative evaluation of breast glandular tissues in the general male population. The aims of this study were to supply radiological-based measurements of breast glandular tissue in the general male population, to quantitatively assess the prevalence of gynecomastia according to age by decades, and to evaluate associations between gynecomastia and obesity, cirrhosis, and dialysis.

Materials and Methods: This retrospective study included 506 men who presented to the emergency department following trauma and underwent chest-abdominal computed tomography. Also included were 45 patients undergoing hemodialysis and 50 patients with cirrhosis who underwent chest computed tomography. The incidence and size of gynecomastia for all the study population were calculated.

Results: Breast tissue diameters of 22 mm, 28 mm, and 36 mm corresponded to 90th, 95th, and 97.5th cumulative percentiles of diameters in the general male population. Peaks of gynecomastia were shown in the ninth decade and in boys aged 13–14 years. Breast tissue diameter did not correlate with body mass index ($r = -0.031$). Patients undergoing hemodialysis and patients with cirrhosis had higher percentages ($P < .0001$) of breast tissue diameters above 22 mm, 28 mm, and 36 mm.

Conclusions: Breast tissue diameter is a simple and reliable quantitative tool for the assessment of gynecomastia. This method provides the ability to determine the incidence of gynecomastia by age in the general population. Radiological gynecomastia should be defined as 22 mm, 28 mm, or 36 mm (90th, 95th, and 97.5th percentiles, respectively). Radiological gynecomastia is not associated with obesity, but is associated with cirrhosis and dialysis.

Key Words: Gynecomastia; computed tomography; dialysis; cirrhosis; obesity.

© 2017 The Association of University Radiologists. Published by Elsevier Inc. All rights reserved.

INTRODUCTION

Gynecomastia is the benign enlargement of the male breast because of proliferation of the glandular component (1), and is the most common abnormality in the male breast (2). It is caused by an imbalance between estrogen and androgen actions in breast tissue that can occur

through multiple mechanisms (3). A trimodal age distribution has been reported for gynecomastia: during the neonatal period, puberty, and in elderly men (4). The prevalence of gynecomastia varies substantially between different reports, ranging from 32% to 65% (5–8). Etiologies that have been suggested as causes of gynecomastia (9) include physiologic or idiopathic gynecomastia (10–12), medication or substance use (13,14), systemic diseases such as cirrhosis (15,16) or renal failure (17,18), primary or secondary hypogonadism (19,20), hormone-producing tumors such as testicular cancer (21–23), and other causes (9).

Several studies addressed the presumed association between gynecomastia and obesity (8,12,24), but no conclusive results have been presented. In a review article published in the *New England Journal of Medicine*, it is stated that there is a progressive increase in the prevalence of gynecomastia with an increase of the body mass index (BMI), probably reflecting local paracrine effects of estradiol production in the subareolar fat on the breast glandular tissue (3).

Acad Radiol 2017; ■■■■■■

From the Department of Radiology, The Chaim Sheba Medical Center, Tel Hashomer, Emek HaEla St 1, Ramat Gan 5265601 (E.K., N.K., S.R., J.P., M.S., E.M.M., E.K., M.M.A.); Sackler Faculty of Medicine, Tel-Aviv University, Chaim Levanon St 30, Tel-Aviv 6997801 (E.K., N.K., A.G., S.R., J.P., M.S., L.H., S.S., E.M.M., E.K., M.M.A.); Department of Endocrinology, Rabin Medical Center, Petah Tikva (A.G.); Department of Plastic Surgery, Assaf Harofeh Medical Center, Tzrifin, Israel (L.H.). Received July 17, 2017; revised November 12, 2017; accepted November 13, 2017. **Address correspondence to:** E.K. e-mail: eyalkla@hotmail.com

© 2017 The Association of University Radiologists. Published by Elsevier Inc. All rights reserved.
<https://doi.org/10.1016/j.acra.2017.11.008>

The main radiological modalities used for evaluating gynecomastia include mammography, ultrasound, and magnetic resonance imaging (2,25–30), and the evaluation is usually reserved for differentiating between benign disease and breast malignancy (25). Two recently published works have studied gynecomastia in computed tomography (CT) examinations. The first has shown that the finding of gynecomastia on CT examinations of patients with testicular cancer is important as it is associated with non-seminomatous histology and worse prognosis (23). The second has shown that the appearance of gynecomastia on CT scans and mammograms was highly correlated (30). To date, there is no radiological definition of gynecomastia and no quantitative evaluation of breast glandular tissues in the general male population, and the prevalence of gynecomastia in the general male population has been evaluated only by using physical examination. The increased usage of CT scans results in incidental finding of gynecomastia. Having a standardized distribution of CT measurements of gynecomastia is of importance, as patients are frequently referred for endocrinological evaluation for this incidental finding.

The aims of this study were to supply radiological-based measurements of breast glandular tissue in the general male population, to quantitatively assess the prevalence of gynecomastia according to age by decades, and to evaluate the presumed associations between gynecomastia and obesity, cirrhosis, and dialysis.

METHODS

An institutional review board approval was granted for this retrospective study, and informed consent was waived.

Patients

Three patient cohorts were retrieved: a general population group, patients with cirrhosis, and patients undergoing hemodialysis. The general population group included consecutive male trauma patients who presented to our institution's emergency room (December 1, 2011 to May 31, 2015) and had a chest and abdomen CT examination as part of a trauma protocol. The study was conducted at one tertiary care hospital. This acute care hospital has approximately 1100 beds and 185,000 total emergency department visits per year. The center for liver disease in the hospital provides annual treatment for about 200 patients with cirrhosis and another 150 patients after liver transplantation for end-stage cirrhosis. About 230 patients undergoing chronic hemodialysis are treated annually.

The cohort of cirrhotic patients was retrieved using a computerized search for the word "cirrhosis" in our radiology information system (Carestream Vue radiology information system) and interpretation of all chest or chest-abdomen CT scans (December 1, 2011 to August 31, 2015). Diagnosis was confirmed by reviewing patients' medical files. A similar search was used for patients on hemodialysis using the term "hemodialysis" or "dialysis."

The general population cohort was grouped according to age by decades, whereas the ninth decade included the ages of 80–93 years. About 50 random patients were selected from each decade. BMI on admission was retrieved from the patients' medical records. Distributions of breast tissue diameters for the entire study cohort and for each decade of age were calculated, and 90th, 95th, and 97.5th cutoff value percentiles of breast tissue diameters were also calculated.

The proportion of adults in the hospital's region with a BMI of 25 or greater is 60.4% for men and 52.7% for women. Estimated prevalence of obesity (BMI > 30) is 21.4% for men and 24.8% for women (31).

Imaging Technique

The general population group was scanned using a single CT machine Philips Brilliance 64. The patients with cirrhosis and undergoing dialysis were scanned using three CT machines: Philips Brilliance 256, Philips Brilliance 64, and GE Discovery 64. In the general population group, derived from acute trauma patients, patients were administered with intravenous contrast agent (iohexol 350 mg/mL up to 2 mL/kg). In the cirrhosis and dialysis groups, there was a mixture of patients who were administered intravenous contrast agent (iohexol 350 mg/mL up to 2 mL/kg) and oral contrast agent (iohexol 350 mg/mL 52 mL diluted in 2 L water) and patients who did not receive contrast agents.

Imaging Evaluation

CT examinations were analyzed using our institution's Picture Archiving and Communication System (Carestream Vue Picture Archiving and Communication System).

In the general population group, measurements were performed separately by two radiologists: reader A with 7 years' experience at reading CT (E.K.) and reader B with 3 years' experience at reading CT (N.K.); both readers were blinded to BMI measurements. Breast tissue was measured as the maximal axial diameter of the breast glandular tissue, parallel to the areola, for the right and left breasts in a method that was described previously (23) (Fig 1). In the cirrhotic and dialysis groups measurements of breast tissue were conducted using the same method by reader A, who was aware of patients' clinical status (Fig 1).

A third consensus reading was performed in the general population group for breasts that had large discrepancies (>10 mm) between readers A and B.

In the general population group, in addition to breast tissue measurement, subcutaneous fat was measured by reader B as two perpendicular lines taken from the abdominal muscles to the skin, 5 cm to the left and 5 cm to the right of the umbilicus, as previously described (Fig 2) (32).

Although a literature search did not yield studies that evaluated the accuracy of volumetric breast tissue measurements in gynecomastia, volume measurements may better describe the quantity of glandular cells; thus, we have decided to assess the correlation

Download English Version:

<https://daneshyari.com/en/article/8820939>

Download Persian Version:

<https://daneshyari.com/article/8820939>

[Daneshyari.com](https://daneshyari.com)