

Gynaecomastia:

An Analysis of the Workload and of the Cost/Yield Ratio of Investigation

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Abstract:

AIMS: 1) To determine the workload from gynaecomastia in a DGH with a catchment population of 270 000. 2) To see whether a specialised clinic was justifiable. 3) To assess the cost: yield comparison of the investigations performed for gynaecomastia.

METHOD: All patients presenting to a single consultant's breast clinic between December 2004 and April 2006 were included. Their investigations and results were noted. The cost of those investigations was calculated.

RESULTS: 36 patients with confirmed gynaecomastia were seen in this period. Investigations carried out included FBC, U&E, LFT, TSH, CK, testosterone, oestradiol, prolactin, FSH/LH, AFP, CXR, mammography, USS of the breast, abdomen and testes, core biopsies and FNA cytology. The total potential cost of investigating gynaecomastia was £255 per patient.

CONCLUSIONS: We calculated that approximately 50 new cases would be seen per year in our hospital. At 12 new cases per clinic this would require only 4 clinics per year therefore a specialised clinic is not justifiable. The investigations for gynaecomastia are expensive with a poor yield. Based on the number of tests and cases seen here we would expect to see 0.5 cases of male breast cancer per year at a cost of £25 500 per diagnosis made.

KEY WORDS: Gynaecomastia, workload, investigation, cost

Introduction:

Gynaecomastia affects up to 65% of adult men.¹ In 3% of cases it is caused by a malignancy of the testes, adrenals, pituitary gland or the breast.² Although up to 75% of cases are idiopathic it is the fear of missing an occult, potentially treatable tumour that prompts clinicians to investigate affected patients.³ To date at least 19 conditions and 28 drugs have been implicated in causing gynaecomastia.^{1,4,5} To investigate and exclude each potential cause could require a large number of investigations to be done at significant expense to the provider. The purpose of this study was to find out if the workload created by gynaecomastia justified the creation of a separate specialist clinic in our hospital with its catchment population of 270 000. Additionally we sought to assess the diagnostic yield of these investigations and to compare it with their cost to establish a cost-effective investigation protocol.

Method:

All male patients presenting with unilateral or bilateral breast enlargement to a single consultant's clinic between December 2004 and April 2006 inclusive were included in the study. Each patient was managed on an individual basis and the use of investigations was not guided by any predetermined proforma or guidelines. The results of their investigations were documented retrospectively and any abnormal results were highlighted. For each investigation we consulted the budget manager of the appropriate department to calculate the cost of carrying out that test. From this we calculated how much it would cost our hospital if every patient received every potentially

appropriate investigation and how much it would cost in order to identify one malignancy of the breast.

Results:

36 patients with confirmed gynaecomastia were seen in this 17-month period. Fifteen of these were bilateral. The ages of the patients ranged from 14 to 86 years. (fig 1.)

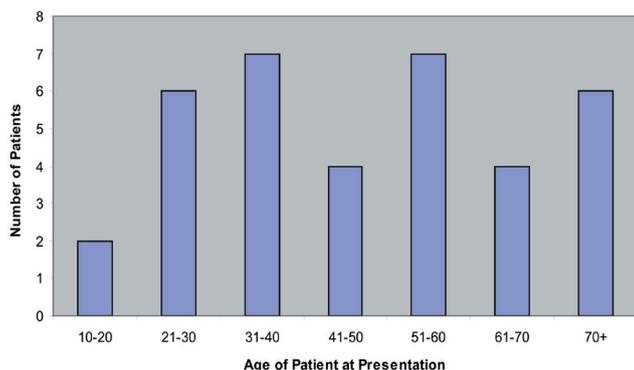


Figure 1. Age Range of Gynaecomastia Patients

The rates of investigation and abnormal results are shown in table 1.

Investigation	Number Performed	Number Abnormal	Percentage Abnormal
FBC	28	1	3.4
U&E	32	2 (both CRF)	5.3
LFT	32	2 (both cirrhotics)	5.3
TSH	31	0	0
CK	3	2 (both raised)	66.7
Testosterone	29	5 (all low)	17.2
Oestradiol	30	2 (both raised)	6.7
Prolactin	25	5 (all high)	20
LH/FSH	7	1 (raised)	14.3
LDH	21	2 (both raised)	9.5
AFP	27	0	0
Chest X-ray	20	2	10
Mammography	15	1 – M1 14 – M2	0
USS Breast	36	2 – U1 33 – U2 1 – U3	2.8
USS Abdomen & Testes	10	5 (4 cirrhotic, 1 AAA)	50
Trucut biopsies & FNAC	4	4 (3 gynaecomastia, 1 fibrocystic change)	100

Table 1: Investigation Rates and Abnormal Yield

The only investigation which was universally

applied was ultrasonography of the breast. All other investigations were applied on an individual patient basis.

Of the blood tests only CK, testosterone, prolactin and LH/FSH had an abnormal yield of 10% or greater. All the radiological investigations yielded 10% or fewer abnormal results except for USS of the abdomen and testes which showed ascites in 4 patients (40%) and an abdominal aortic aneurysm in 1 other patient (10%). All 4 (100%) histological/cytological investigations were abnormal.

The total combined cost of all the blood tests used was £40. The cost to the hospital of a chest x-ray was £16. Ultrasound of the breast, abdomen and testes cost £33 each. Mammography was the most expensive radiological investigation at £56. The cost of core biopsies or FNAC was £44. Potentially this means that fully investigating one patient with gynaecomastia could cost £255.

Discussion:

Workload

Thirty six patients over a 17-month period represent an annual referral rate of just over 25 patients per consultant. This would suggest that for the 2 consultants within our hospital roughly 50 new cases of gynaecomastia would be seen annually. If 12 new patients were to be seen in a specialised gynaecomastia clinic then only four would be required per year. This would mean that patients could be waiting up to three months with a potential malignancy to be seen by a specialist. This clearly breaches the “two week rule” in effect throughout the NHS therefore the workload from gynaecomastia in our hospital is insufficient to justify the creation of such a clinic.

Cost: Yield Analysis

If all 50 patients received all the potentially appropriate investigations, our Trust would

be spending £12 750 per year investigating gynaecomastia. In roughly 3% of cases gynaecomastia is associated with an underlying malignancy, usually of the testes.^{2,5,6} Potentially therefore we could expect to spend £8 500 per cancer found, however the majority of such tumours are unlikely to present solely with gynaecomastia and in most it is likely to be an incidental finding. Such patients are also more likely to present with other symptoms to non-breast surgeons first (e.g. urologists, endocrinologists etc). It could be argued that because the potential to miss an occult malignancy remains, thorough examination and investigation using blood tests and radiological assessment is still necessary.^{1,2,4}

If we were to assume that all other malignancies would be seen by non-breast surgeons then the only remaining malignant pathology that would require exclusion in our clinic would be carcinoma of the breast. Male breast cancer is uncommon, accounting for only 0.2% of all malignancies and only 1% of all breast cancers.^{2,7,8} It has been suggested that those patients with breast cancer should be clinically distinguishable from those with simple gynaecomastia however the incidence of breast cancer presenting as gynaecomastia is unclear.^{5,7,9} Typically male breast cancer presents as a painless retroareolar mass often eccentric to the nipple whereas gynaecomastia normally presents as a smooth disc centred immediately behind it.⁸ Post-mortem studies have suggested gynaecomastia is present in 50% of all male breast cancer patients.⁷ Conversely, whilst the incidence of male breast cancer is low, the incidence of gynaecomastia is high. Weiss et al quote studies in which the incidence of male breast cancer in patients either presenting with, or with a history of, gynaecomastia varies from 0% to 12.5%.^{7,8} A conservative estimate would be that approximately 1% of gynaecomastia patients will have carcinoma of the breast at presentation. If we use this figure then in our

hospital we could expect to see 0.5 cases per year at a cost of £25 500 per diagnosis made.

Blood Tests

It could also be argued that for some of the investigations used the primary pathology which they are intended to exclude is not malignant and therefore they are unnecessary. This is particularly true of the blood tests - for example urea and electrolytes (U&E), thyroid stimulating hormone (TSH) and creatine kinase (CK). However, whilst these tests are not likely to identify occult malignancies it is not impossible that they might do so and for this reason, coupled with the low relative combined cost of the blood tests compared to the radiological and pathological investigations, their inclusion is justifiable. It could also be counter-argued that the pathologies they are intended to identify are potentially serious or easily treated, further justifying their performance.

Radiological Investigations

Normal male breast tissue consists of fatty and fibrous tissue with a few duct-like structures in the subareolar region.¹⁰ Mammographically this shows as homogeneously radiolucent tissue with minimal ductal or interlobular connective tissue.¹⁰ True gynaecomastia (male breast enlargement due to enlargement of the glandular component of the breast tissue) is reliably distinguished from pseudogynaecomastia (accumulation of excess fat within the breast tissue in obese subjects) by mammography.^{3,10} The former shows duct-like structures usually in the subareolar region extending into the deep planes with progression showing as a generalised increase in density.^{10,11} The latter simply shows as an enlarged breast filled with radiolucent subcutaneous fat.^{10,11} Gynaecomastia differs from male breast cancer mammographically in that it shows as a mass with a concentric subareolar position, no spiculated margins, no calcification and no

secondary signs of malignancy.¹⁰ It is known that the increased density in gynaecomastia may mask underlying carcinoma however the accurate diagnosis of male breast cancer using mammography alone has been reported with sensitivities and specificities exceeding 90%.^{8,10}

Ultrasonography also demonstrates progression of gynaecomastia from the hypoechoic appearance of early glandular hyperplasia to the increased volume and echogenicity of the more advanced, fibrotic disease.¹⁰ Early carcinoma and early focal gynaecomastia are both hypoechoic resulting in diagnostic difficulty.¹⁰ In contrast to mammography, ultrasound alone is not reliable enough to distinguish male breast cancer from other aetiologies.⁸

Many radiologists feel that mammography is the only imaging that should be used routinely and that the only use of male breast ultrasound is as a guide to surgery to distinguish true gynaecomastia (needing a subcutaneous mastectomy) from pseudogynaecomastia (needing liposuction).

Histological/ Cytological Investigations

If male breast cancer cannot confidently be clinically excluded then fine needle aspiration cytology (FNAC) or biopsy are required.^{3,8} FNAC has been shown to be a reliable investigation for the exclusion of carcinoma if sufficient numbers of cells are obtained.^{1,12,13} Unfortunately the yield of cells is unsatisfactory in up to 15% of cases of gynaecomastia thus necessitating repeated testing.^{1,4,14} This has led to controversy over the use of FNAC alone in male breast lesions.⁴ Needle core biopsy has been advocated as an alternative due to the high rate of unsatisfactory cell yields using FNAC.¹⁴

Conclusion

The implications of the cost and low yield of investigating gynaecomastia have prompted several attempts to identify safe, cost-effective management strategies.^{2,5,15} These have all advocated an approach starting with the basics of thorough history and examination. The history should concentrate on breast symptoms, sexual functioning and secondary sexual characteristics, symptoms of thyroid disease and drug history including recreational drug use.^{3,15} Physical examination should include assessment of the patient's general body habitus and the breasts, thyroid gland, liver and external genitalia.^{2,15} Following clinical assessment there appears to be little uniformity with regard to further management. Some clinicians feel that simple reassurance is all that is required if clinical assessment reveals no evidence of sinister pathology.^{1,4} Others advocate the judicious use of blood tests, radiological and cytological investigations and the remainder extensively investigate as a matter of routine in order to avoid missing the unexpected occult malignancy.^{2,3,5,6,8,15} It is the opinion of the authors that the extent to which a clinician investigates a patient with gynaecomastia is primarily dependent on their clinical suspicion of a sinister underlying aetiology. We would advocate the selective use of investigations based on the clinical assessment of the patient rather than the cost of the investigations in question.

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