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Original Research

The challenge of rapid diagnosis in oncology: Diagnostic accuracy and cost analysis of a large-scale one-stop breast clinic

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Abstract ***Purpose:*** Rapid diagnosis is a key issue in modern oncology, for which one-stop breast clinics are a model. We aimed to assess the diagnosis accuracy and procedure costs of a large-scale one-stop breast clinic.
Patients and methods: A total of 10,602 individuals with suspect breast lesions attended the Gustave Roussy's regional one-stop breast clinic between 2004 and 2012. The

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multidisciplinary clinic uses multimodal imaging together with ultrasonography-guided fine needle aspiration for masses and ultrasonography-guided and stereotactic biopsies as needed. Diagnostic accuracy was assessed by comparing one-stop diagnosis to the consolidated diagnosis obtained after surgery or biopsy or long-term monitoring. The medical cost per patient of the care pathway was assessed from patient-level data collected prospectively.

Results: Sixty-nine percent of the patients had masses, while 31% had micro-calcifications or other non-mass lesions. In 75% of the cases (87% of masses), an exact diagnosis could be given on the same day. In the base-case analysis (i.e. considering only benign and malignant lesions at one-stop and at consolidated diagnoses), the sensitivity of the one-stop clinic was 98.4%, specificity 99.8%, positive and negative predictive values 99.7% and 99.0%. In the sensitivity analysis (reclassification of suspect, atypical and undetermined lesions), diagnostic sensitivity varied from 90.3% to 98.5% and specificity varied from 94.3% to 99.8%. The mean medical cost per patient of one-stop diagnostic procedure was €420.

Conclusions: One-stop breast clinic can provide timely and cost-efficient delivery of highly accurate diagnoses and serve as models of care for multiple settings, including rapid screening-linked diagnosis.

1. Introduction

Mammographic breast cancer screening programmes allow a 20% reduction in breast cancer-specific mortality overall [1–4]. However, they are the subject of many controversies related to a 10–15% rate of overdiagnosis, high costs, as well as a 1.6% rate of false positivity, leading to anxiety, unnecessary biopsies and over-costs [1–4]. Rapid diagnosis after a positive screening allows rapid care or reassurance depending on the final diagnosis. One-stop diagnostic facilities that offer same-day diagnosis and integrated multidisciplinary care have been piloted and implemented since the 1990s to increase quality and reduce delays in obtaining diagnosis in case of suspected breast cancer. While they were initially developed in the context of symptomatic breast diseases [5,6], they appeared as an opportunity for rapid diagnosis in the context of generalised screening. In France, the national breast cancer screening programme for women aged 50–74 years was launched in 2004 [7]. Gustave Roussy opened a large-scale pilot multidisciplinary one-stop breast clinic in April 2004 in an attempt to reduce delays, increase quality through multidisciplinarity, increase patient's satisfaction and well-being, and implement molecular medicine and modern imaging. Few data are available regarding the diagnostic accuracy of modern multidisciplinary one-stop clinics, and no cost evaluations are available. The aim of this study is to report the 8-year results of a large-scale pilot one-stop breast clinic in terms of diagnostic accuracy, time intervals to render diagnoses, and costs.

2. Methods

2.1. Participants and interventions

Gustave Roussy opened a one-stop diagnostic clinic dedicated to individuals identified with suspect, not yet diagnosed, breast lesions, on 5th April 2004. All care is provided in a single site within the hospital, where all necessary tools and skills are available, including breast imaging and fine needle aspiration (FNA). The costs of the venues are largely covered by public insurance, so that any patient with a national insurance coverage can attend. Patients are seen once a week, on Mondays, by a dedicated multidisciplinary team. Multidisciplinary team decisions are taken over the day and diagnoses assorted with care plans (whether cancer or benign) are given to the patients as soon as an initial diagnosis is available. Patients with suspect masses undergo ultrasound-guided FNA as initial procedure towards an immediate diagnosis. FNA is performed by the pathologist himself under radiological guidance by the radiologist and immediately quality checked and stained. If FNA identifies a cancer, additional information regarding this cancer characteristics is obtained through ultrasound-guided biopsy or surgery, as required. Patients with non-mass lesions or with mass lesions for which FNA is inconclusive (suspect/atypical/undetermined) undergo image-guided biopsy on the same day. For the purpose of this analysis planned after registration of 10,000 individuals attending the one-stop breast clinic, data were collected retrospectively for all consecutive patients seen for a suspect breast lesion and