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Pharmacoeconomic Issues in Breast Cancer Therapy

Breast cancer represents the most common type of cancer for female patients. It is estimated that approximately 210,000 new cases occurred in 2010 in USA, while approximately 40,000 patients succumbed to their disease (1). Because of its high incidence, it is clear that breast cancer is a disease with a great epidemiologic and economic burden. There are many alternative therapies for managing patients nowadays, each of which is associated with different efficacy, safety and economic profile. Given the fact that resources are scarce, they must be invested in those options that maximise the health outcomes gained.

Direct and Indirect Costs of Breast Cancer

The total cost of breast cancer includes not only the medical cost (i.e., cost of screening, prevention, pharmaceutical treatment, surgical intervention, and palliative care) but also the indirect cost of the disease in terms of lost productivity and premature deaths. This issue becomes very important given that a significant percentage of the cases of breast cancer occur in women younger than 50 years of age and that breast cancer is the leading cause of cancer-related death in women of the productive age of 20 to 59 years (1). However, despite this fact the majority of studies take into account only direct costs, although it is often the smallest contributor to the total cost per patient (2).

A review of the literature performed by our group, studying the economic impact of breast cancer found that in the US the lifetime cost per patient varied between 15,000 euro and 75,000 euro, with chemotherapy being the greatest driver of the total direct cost while the mean monthly cost per patient was 2,152 euro (2). In Sweden, the annual total cost for patients with metastatic breast cancer was estimated at approximately 35,000 euro. Hence, breast cancer patients impose significant burdens upon healthcare systems, especially in terms of drug management. Another important driver of economic burden relates to surviving breast cancer patients or breast cancer recurrences, mostly because of the intense use of medical resources for management and follow-up (2).

Healthcare Improvements and Their Economic Impact

During the last decade, several improvements have occurred in the field of drug treatment for breast cancer patients. A number of these have been integrated into everyday clinical practice and have substantially changed the landscape of breast cancer treatment. Namely these are the incorporation of taxanes in the adjuvant treatment (3), the use of aromatase inhibitors (letrozole, anastrozole, exemestane) versus tamoxifen for patients with hormone receptor positive breast cancer (4;5), and the use of trastuzumab or lapatinib for patients with Her-2 positive disease, either in the adjuvant or advanced disease setting (6).

However, apart from their undoubted clinical significance these new treatments have an important impact on healthcare systems and healthcare resources and are associated with substantially higher costs compared to traditional ones. In this light, policy-makers and managers should consider evidence regarding the cost-effectiveness of these new therapies, in order to optimise the use of the finite resources of health-systems.

Taxanes

Taxanes in the adjuvant setting were proved to be cost-effective, with a reported cost per quality adjusted life year (QALY) for taxane vs. non-taxane-containing treatment therapies between 14,000–50,000 euro, depending on the taxane used (docetaxel or paclitaxel) and the specific trial used as the basis of the analysis (7).

Aromatase Inhibitors

Aromatase inhibitors (AIs) have been tested against tamoxifen either in the adjuvant or in advanced disease setting and proved to be cost-effective (2). Studies evaluating the cost-effectiveness of AIs in metastatic breast cancer have clearly demonstrated that AIs are cost-effective compared to tamoxifen with a mean incremental cost per life year gained (LYG) of 2,786 euro (8). In the adjuvant setting three different strategies have been tested versus the standard of five years if tamoxifen: either upfront AI, or sequential after two to three years of tamoxifen for a total of five years or finally extended treatment with AI after five years of tamoxifen. An economic analysis evaluated all these three different strategies (9). The cost-effectiveness ratios for AIs (data are available only for anastrozole and letrozole) as initial upfront treatments versus tamoxifen were estimated to be 38,000 euro and 25,700 euro per QALY, respectively. For the sequential approach, data was available only for anastrozole and exemestane. The cost-effectiveness ratios were estimated to be 26,500 and 22,800 euro per QALY, respectively. Finally, in the extended adjuvant setting, data were available only for letrozole and the cost per QALY was estimated to be 11,700 euro.

Trastuzumab

A recently published systematic review evaluated the cost-effectiveness of adjuvant trastuzumab treatment (10). Cost-effectiveness ratios reported, ranged from 3,728 euro/QALY to 99,975 euro/QALY, but most studies reported favorable costeffectiveness values (ie, below 37,000

euro/QALY). In a similar way a National Institute of Health and Clinical Excellence (NICE) guideline evaluated all the available data for the trastuzumab adjuvant studies and estimated that the incremental cost per QALY gained with adjuvant trastuzumab treatment ranges from 19,000 euro to 39,000 euro (11).

Lapatinib

Recently lapatinib in combination with capecitabine was proved to offer a statistically significant prolongation of time to tumor progression in patients with metastatic breast cancer, over single-agent capecitabine (12). However, a cost-effectiveness analysis of this trial failed to demonstrate that lapatinib was clearly cost-effective for the treatment of patients with Her-2 positive metastatic breast cancer. The combination of capecitabine/lapatinib was associated with a cost per LYG of 120,184 and a cost per QALY gained of 192,279 euro(13). This drug was also rejected by NICE as not being cost-effective (14).

Conclusions

A literature review of recently published studies evaluating the cost-effectiveness of the aforementioned therapies has concluded that these therapies are in general cost-effective, in various settings and countries, with incremental cost-effectiveness ratios in line with those of many other reimbursed therapies (2), with the only notable exception of lapatinib.
Such pharmacoeconomic analyses are valuable for health policy-makers and hospital managers because they facilitate decision-making and optimisation of the use of scarce healthcare resources allocated to the treatment of cancer and the care of patients.

Editor's note: All currency has been converted to euro using the daily exchange rate.

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