A Cost Benefit Analysis of First Line Letrozole in Hormone Sensitive Advanced Breast Cancer Using Time to Chemotherapy (TTC) as a Measure of Benefit

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Abstract

Background: Historically, tamoxifen has been the standard first line hormonal therapy for postmenopausal women with advanced breast cancer. A large randomized trial recently demonstrated that letrozole is superior to tamoxifen in terms of progression free survival and objective tumor response (Mouridsen et al., 2003). Furthermore, the TTC was 16 months for patients treated with letrozole compared to 9 months in the tamoxifen group (P=0.005). The ability to delay chemotherapy has important quality of life and economic implications, particularly as it relates to high cost chemotherapy. In this study, the difference in TTC between letrozole and tamoxifen was used in an exploratory economic analysis.

Methods: A CBA from the perspective of the Canadian health care system was conducted. The analytical time period was the first 16 months following the initiation of first line hormonal therapy with letrozole. The benefit portion of the study was the total cost of the chemotherapy that would be delayed with letrozole. Since the type of chemotherapy was not collected in the pivotal trial, several scenarios were investigated. These included an anthracycline-based regimen, taxanes, vinorelbine and paclitaxel with trastuzumab in HER2/neu positive patients.

Results: The total cost of letrozole for 16 months would be $Cdn992,928. In contrast, the cost of various types of chemotherapy after 9 months of tamoxifen are higher and ranged from $Cdn61,135 for anthracycline-based regimens to $Cdn101,612 for docetaxel. The potential economic benefit was particularly high for paclitaxel with trastuzumab in HER2/neu positive patients which had an overall cost of $Cdn7,250 per patient.

Objectives

1. To assess the feasibility of using “time to chemotherapy” in a cost benefit analysis of hormonal treatments for advanced breast cancer.
2. To determine the net cost or benefit of using letrozole in place of tamoxifen as first line therapy in this patient population.

Methods

Estimation of Cost

The use of letrozole as first line hormonal therapy delays chemotherapy by approximately 7 months compared to first line tamoxifen. To derive this benefit (i.e. chemotherapy delay), patients would have to be treated with letrozole for approximately 16 months.

Hence, Cost = Monthly Cost×x 16 months

Estimation of Benefit

It was assumed that chemotherapy would be offered to patients who had progressed on tamoxifen. The chemotherapy protocols considered for this analysis were an anthracycline combination (i.e. FAC), paclitaxel, docetaxel and vinorelbine with trastuzumab in HER2/neu positive patients. As published previously, it was assumed that FAC, paclitaxel/docetaxel and vinorelbine would be administered for a median of 5, 4 and 6 cycles respectively (Leung et al., 1999).

Summary of Primary Findings

1. Using the “time to chemotherapy” data, letrozole would result in an overall net benefit (i.e. delay) regardless of the type of chemotherapy offered.
2. The immediate economic benefit would be particularly high with docetaxel or in HER2/neu positive breast cancer patients treated with trastuzumab + paclitaxel.
3. “Time to chemotherapy” in the requirement for chemotherapy may also lead to quality of life benefits in the prolongation of time free from the acute toxicities associated with cytotoxic agents.

Study Limitations & Potential Biases

1. The current study did not directly consider patient preferences nor the potential quality of life benefit secondary to delaying chemotherapy.
2. Not all patients with progressive disease would receive chemotherapy.
3. The economic benefit is from delay and not necessarily total avoidance because most of these patients would require chemotherapy.
4. Therefore, the overall cost benefit may be overestimated if applied to the entire group of patients treated with first-line letrozole.
5. The current analysis was hypothesis-generating in nature. Prospective pharmacoeconomic studies are required to test these hypotheses.

Conclusions

1. In the current exploratory analysis using “time to chemotherapy” data, letrozole would result in a cost delay to the health care system regardless of the type of chemotherapy used.
2. The net economic benefit would be particularly high in situations where docetaxel or trastuzumab would be used.
3. Therefore, “time to chemotherapy” can be a novel endpoint for cost benefit analyses of non-cytotoxic agents.

References