Evaluation of cost savings associated with liquid biopsy in minimal residual disease-negative stage ii colon cancer patients

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Abstract

Background: Adjuvant chemotherapy (ACT) in colon cancer (CC) is guided by clinicopathological features. However, this approach has limitations in predicting survival and ACT benefit, potentially leading to imprecise clinical decisions especially in stage II CC. Liquid biopsy (LB) allows for more accurate patient selection by identifying minimal residual disease (MRD), thereby reducing unnecessary treatments in MRD-negative and allowing a more efficient allocation of resources toward MRD-positive patients.

Objective: To evaluate the cost savings associated with implementing LB in stage II CC patients.

Methods: Direct (DC) and indirect costs (IC) were calculated for stage II CC patients who underwent ACT at IRCCS Ospedale Policlinico San Martino (Genoa, Italy) between 2016 and 2022. DC included tumor informed-LB, day hospital care, inpatient stays, chemotherapy drugs (capecitabine with/without oxaliplatin), DPYD test, and venous catheters. IC included workdays lost for patients of working age (<65 years) and for caregivers. Based on the DYNAMIC study, it was assumed that stage II MRD-negative CC patients (especially non-T4) could safely omit ACT, in contrast with the current recommendations of international guidelines.

Results: Among 1,046 surgically resected CC patients, 348 had stage II disease, of whom 299 were candidates for ACT (pathological T3 with intermediate-risk factors). The DC per patient (p.p.) for eight cycles of capecitabine was €12,543.41, while for eight cycles of XELOX it was €12,760.41. IC amounted to €1,900.32 for patients <65 years and €696.72 for those >65 years. In the case of MRD negativity, LB testing (€3,150 p.p.) would lead to the following savings: €15,466.17 p.p. for patients <65 years treated with XELOX; €14,715.37 p.p. for patients >65 years treated with XELOX; €13,131.65 p.p. for patients <65 years treated with capecitabine; €11,239.85 p.p. for patients >65 years treated with capecitabine.

Conclusions: The introduction of LB for intermediate-risk stage II CC patients enables significant cost savings by avoiding unnecessary ACT in MRD-negative cases, reducing hospitalizations, and minimizing workday losses for patients and caregivers. Further analyses are ongoing to develop a comprehensive economic model that integrates both MRD-positive and MRD-negative stage II CC patients, to better assess the cost-effectiveness of LB implementation in the Italian public healthcare system.

Do you have any conflicts of interest?

No, I do not have a conflict of interest.