Patterns of Provider Imaging Practices and Associated Outcomes of Advanced Colorectal Cancer

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INTRODUCTION

- Colorectal cancer (CRC) is the third most common cancer-related cause death in both men and women in the U.S.[1]
- ~20% of patients diagnosed with CRC in the U.S. are with metastatic disease. 20-25% of patients with non-metastatic disease develop recurrent metastatic disease.[1,2]
- The 5-year survival rate for those diagnosed with distant-stage disease is 14%.[1]
- The standard of care for patients with metastatic CRC are systemic chemotherapies including fluoropyrimidines/ capecitabine and either oxaliplatin (FOLFOX/ XELOX) or irinotecan (FOLFIRI/ XELIRI).[3]
- Addition of bevacizumab to standard combination chemotherapy is associated with improved survival for metastatic CRC patients only.[4,5]
- Follow-up with computerized tomography (CT) scans can closely monitor disease progression and may provide an opportunity for switching therapy, thus improving survival in metastatic CRC population.
- However, the patterns of CT scan utilization in the real-world setting is unknown.

OBJECTIVES

- To explore the real-world utilization of follow-up of CT scans in patients with advanced CRC.
- To assess the impact of intensity of CT scan follow-up plan on the likelihood of treatment switch and survival of patients with advanced CRC.

DATA AND STUDY COHORT

Study design: Retrospective cohort analysis.

Data: Optum's de-identified Clinformatics® Data Mart Database (2008-2016).[6]

Inclusion criteria:

(1) Have 1 inpatient or 2 outpatient diagnoses of CRC on separate dates.

(2) Have received the standard 1st-line combination chemotherapies: FOLFOX, FOLFIRI, XELOX, or XELIRI in combination with bevacizumab.

- The starting data of the combination chemotherapy was registered as the index date.
- End of the 1st course of chemotherapy was defined as the emergence of a 60-day gap or a treatment switch from irinotecan-based regimen to oxaliplatin-based regimen, and vice versa.
- The treatment duration of the 1st course of chemotherapy was calculated.

(3) Continuous enrollment 120 days before the index date (baseline period) and 180 days post the index date.

Exclusion criteria:

(1) Younger than 18 years old at index.

(2) Have received any of the chemotherapies of interest in the baseline period.

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ANALYTIC METHODS

Key explanatory variables

- CT scans utilization (assessment period shown in Figure 1)
- Time to the first follow-up CT scan from the index date, surrogate as the intensity of follow-up schedule
- The median first follow-up CT scan plus one standard deviation (SD) was used as the cutoff point to divide patients.
  - Intensive follow-up group (time to the first follow-up ≤ cutoff)
  - Relaxed follow-up group (time to the first follow-up > cutoff)
- Length of the 1st round of chemotherapy
- Chemotherapy locations
- Patient baseline characteristics: gender, age at diagnosis, type of insurance, Medicare enrollment, region of care, health resources allocation (categorized by the number of health professionals per 100,000 population in each state), prior hospitalization, and comorbidities.

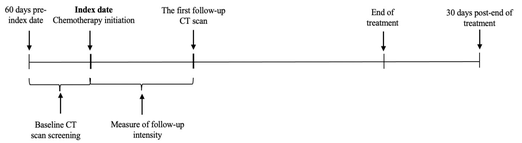

Figure 1. CT scan utilization assessment period.

Outcomes

- Likelihood of treatment switch
  - From oxaliplatin-based regimen to irinotecan-based regimen
  - From irinotecan-based regimen to oxaliplatin-based regimen
- Likelihood of death.

Statistical Analysis

- Chi-square test and T-test were used to explore the characteristics of the patients who had intense vs. relaxed follow-up CT scans.
- Cox proportional hazard models were applied to assess:
  - Treatment switch
  - Death

RESULTS

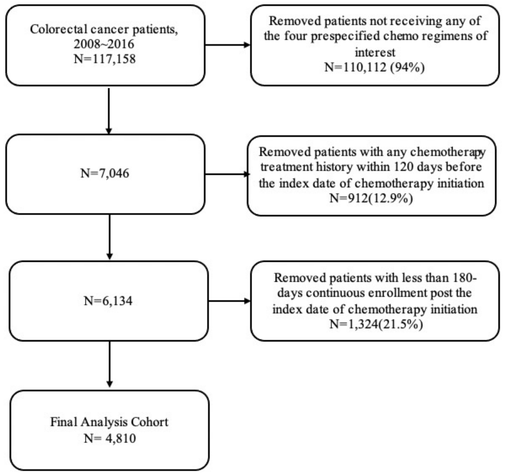

Figure 2. Patient selection flow

Patient Characteristics

- A total of 117,158 patients were identified with the diagnosis of CRC (Figure 2).
- 7,046 received the study chemotherapy regimen, surrogate of advanced stage.
- 4,810 patients were selected for the final analysis.
- 58.48% patients are male; the median age is 66 years (range: 19-90).
- Being younger than 65 and/or receiving care in regions with greater healthcare resources are the only factors predicting the intense follow-up schedules.

CT scan utilization

- The mean and median number of CT scans were 4 and 3.
- The median (SD) time to the first CT scan post-index was 57 (47) days.

RESULTS(CONT.)

Likelihood of treatment switch

- The Cox model showed that an earlier follow-up scan was associated with significantly greater chance of treatment switch **(HR=0.99; 95% C.I.: 0.99-0.99** for each day of delay).
- Patients younger than 50 were more likely to switch treatment (**HR=1.22, 95% C.I.: 1.03-1.44**).
- Patients who initiated on FOLFIRI or XELIRI were much less likely to switch (**HR=0.37, P<0.01** for FOLFIRI recipients, **HR=0.28, P<0.01** for XELIRI recipients).

Likelihood of death

- We found a negative association between time to first follow-up scan and the likelihood of death, meaning that patients with an earlier follow-up scan had shorter survival (**HR=0.99; 95% C.I.: 0.99-0.99** for each day of delay).
- Compared to being older than 65, younger age was a predictor of better survival (**HR=0.70** for those aged <50, P<0.01; **HR=0.83** for those aged 50-65, P <0.01).
- Liver disease was the only comorbidity that was found to significantly increase the risk of death (**HR=1.35, P<0.01**).

CONCLUSIONS

- We found a wide variation in the real-world practices of CT scan follow-up among mCRC patients.
- More intense CT scan follow-up schedule was found to be associated with greater likelihood of treatment switch.
- Yet a more intense CT scan follow-up is not associated with improved survival.
- Patients with aggressive disease decline rapidly prompting their physicians to do an intensive follow-up.

Study limitations:

- Our analysis is retrospective and limited to a medical paid claims dataset.
- The results are potentially subject to unmeasured confounding factors. Specifically, it is impossible to control for all risk factors given the data collected in real-world setting.
- Due to lake of data on cancer stage, we relied on bevacizumab as the surrogate to identify patients in advanced stage so that we didn't capture those did not receive bevacizumab.

REFERENCE