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Describing systemic anti-cancer therapy pathways in metastatic colorectal cancer patients using real-world data.
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Title: Describing systemic anti-cancer therapy pathways in metastatic colorectal cancer patients using real-world data

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Background: The rapid uptake of new medicines for metastatic colorectal cancer (mCRC), together with the wide range of potential combinations and sequences available for treating mCRC, presents challenges for clinicians in deciding the optimal treatment plan for their patients. Published studies describing treatment pathways for mCRC in routine practice are scarce, mainly due to the complexity of the clinical pathways that depend on a combination of patients' characteristics, tumour clinicopathological characteristics, and previous treatment outcomes. This study aims to illustrate the variation in treatment pathways in mCRC patients in NHS Greater Glasgow and Clyde (NHS GGC).

Methods: National and local Scottish datasets, including the chemotherapy electronic prescribing and administration system (CEPAS), the Scottish Cancer Registry, and the national records of Scotland, were linked retrospectively using the Scottish community health index (CHI) number as a common identifier. Data for adult patients diagnosed with mCRC and who received at least one mCRC systemic anti-cancer treatment (SACT) in NHS GGC from 01/01/2015 to 31/12/2016 were used to develop a Sankey plot in R studio to illustrate the treatment pathways. Patients were followed up until death, loss to follow up or end of the study on February 28, 2018, whichever occurred first.

Results: A total of 277 patients were identified; 220 (79.4%) patients had no prior mCRC SACT before the study period. The initial SACT in the study for most patients was a doublet of either FOLFOX (n=60, 21.7%), CAPOX (n=26, 9.3%) or FOLFIRI (n=6, 22.4%), whilst 54 (18.8%) patients received 5-fluorouracil monotherapy, and 75 (26.1%) patients received triplet therapy of cetuximab + FOLFIRI or aflibercept + FOLFIRI. Overall, 39 unique SACT pathways were identified, as shown in figure 1. 209 (75.5%) patients received only one line of SACT, and 68 (24.5%) patients received at least two different lines of SACT during the study. Of these, 18 (26.5%) patients had their initial SACT downgraded from a triplet to a doublet or from a doublet to monotherapy, whereas 19 (27.9%) patients had their initial SACT upgraded from monotherapy to a doublet or from a doublet to triplet. Only six patients received three distinctive treatment lines during the study timeframe. The median duration for the first SACT treatment was 112 days (IQR: 57-167 days), whereas the median time from the first SACT to the second line of SACT was 222.5 days (IQR: 98-319 days). And the median time from the end of the first SACT and the beginning of the second SACT was 80 days (IQR: 21-163 days).

Conclusion: Visualisation tools such as the Sankey plot can describe the complex treatment pathways in routine practice. Although Sankey plots need careful interpretation, health care professionals can utilise them to improve the delivery of personalised cancer care.

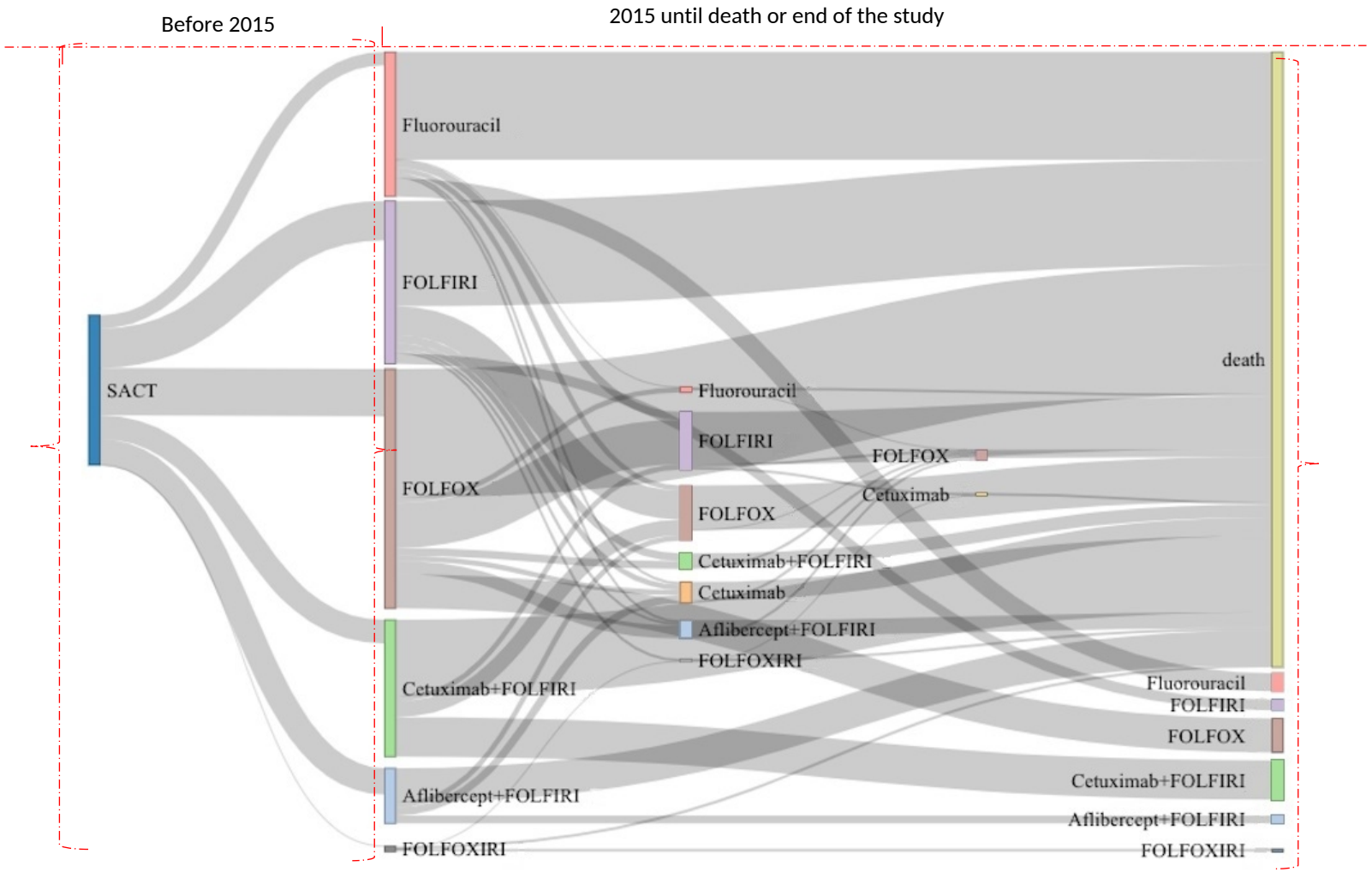

Figure 1. Sankey plot illustrating treatment pathways for metastatic colorectal cancer patients treated in NHS Greater Glasgow and Clyde (N=277)

KEY: SACT= systemic anti-cancer therapy, FOLFOX= r 5- fluorouracil+oxaliplatin, FOLFIRI= 5- fluorouracil+irinotecan, FOLFOXIRI= 5- fluorouracil+oxaliplatin+irinotecan