Review of the current status of RAS mutation testing in patients with metastatic colorectal cancer (mCRC): Flash-RAS study

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To cite this version:
Jean-Christophe Sabourin, Astrid Lièvre, Jean-Louis Merlin, Michel Ducreux, Pascal Artru, et al.. Review of the current status of RAS mutation testing in patients with metastatic colorectal cancer (mCRC): Flash-RAS study. 18th Annual European Congress of the International Society for Pharmacoeconomics and Outcome Research, ISPOR, Nov 2015, Milan, Italy. <hal-01241776>

HAL Id: hal-01241776
https://hal.archives-ouvertes.fr/hal-01241776
Submitted on 14 Dec 2015

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Introduction

In 2008, it was shown that the presence of a somatic mutation in exon 2 of the gene KRAS was predictive of resistance to anti-EGFR antibodies.

The test for these mutations (KRAS test) thus became necessary before prescribing an anti-EGFR antibody and was incorporated into the Marketing Authorisation (MA) of EGFR inhibitors.

At the end of 2013, these MAs were updated: henceforth, mutation testing must also involve exons 3 and 4 of the KRAS gene and exons 2, 3 and 4 of the NRAS gene, these mutations also having been identified as predictive markers of resistance to anti-EGFR antibodies.

In order to assess the impact of this modification and the real-life conditions in which the tests are carried out, it was decided to set up a French epidemiological study called Flash-RAS. This study follows the Flash-KRAS study conducted in 2011 on KRAS exon 2 genotyping only.

Study objectives

Primary objective:
- To assess the rate of prescribing and conduct of RAS gene mutation tests (KRAS and NRAS exons 2, 3 and 4) in patients recently diagnosed with metastatic colorectal cancer (mCRC).

Secondary objectives:
- To describe the change in the rate of prescribing KRAS gene mutation tests (exons 2, 3 and 4) between 2011 and 2014;
- To describe the reasons for prescribing and non-prescribing these tests depending on the characteristics of the doctors and the patients;
- To analyse the impact of the availability of the KRAS (exons 2, 3 and 4) and NRAS (exons 2, 3 and 4) tests in anatomical pathology laboratories, the impact of their results, the BRAF result, on the therapeutic choice of the doctor or its modification;
- To describe and analyse the clinical characteristics of the patients and the treatments scheduled and received as first line metastatic therapy;
- To describe the technique used for the analysis, the type of mutation sought (if available) and the method of reporting the result to the clinicians (analytical report);
- To analyse the impact of the availability of the KRAS (exons 2, 3 and 4) and NRAS (exons 2, 3 and 4) tests in anatomical pathology laboratories, the impact of their results, the BRAF result, on the therapeutic choice of the doctor or its modification;
- To describe and analyse the time taken to obtain the results of the KRAS and NRAS tests the circuit (who made the request and when) and the therapeutic approach adopted during this period.

Methods

National multicenter retrospective observational study

To prevent a selection bias, each participating physician had to screen all patients seen as part of a routine normal clinic visit, during the "Enrolment Period" and who had to meet all the following inclusion criteria:
- Metastatic colorectal cancer histologically-confirmed after March 2014 (launch of NRAS tests in French centers);
- Seen by the physician between 15 June 2014 and 30 September 2014;
- First-line therapy of metastatic disease initiated between 1 March 2014 and 30 June 2014

Exclusion criteria:
- <18 years
- Refused to participate
- Active participation in an interventional study.

Results

Table 1: patients characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N = 375</th>
</tr>
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<tbody>
<tr>
<td>Sex Male / Female</td>
<td>57.8 / 42.2</td>
</tr>
<tr>
<td>Median age (years)</td>
<td>67 [31 – 92]</td>
</tr>
<tr>
<td>Synchronous metastases</td>
<td>270 [73.6]</td>
</tr>
<tr>
<td>Primary tumour: colon / rectum / colorectal</td>
<td>76 [23.2 / 0.5]</td>
</tr>
<tr>
<td>Interval to diagnosis of the first metastases – L1 treatment [months]</td>
<td>Median: 1.0 [0.0 – 3.6]</td>
</tr>
<tr>
<td>L1 chemotherapy:</td>
<td></td>
</tr>
<tr>
<td>- FOLFIRI / XELOX: 49.6</td>
<td></td>
</tr>
<tr>
<td>- 5 FU / Xeloda: 10.7</td>
<td></td>
</tr>
<tr>
<td>- Others: 1.3</td>
<td></td>
</tr>
<tr>
<td>- FOLFOXIRI: 0.6</td>
<td></td>
</tr>
<tr>
<td>- L1 associated with another target therapy (n, %)</td>
<td>198 [52.2]</td>
</tr>
</tbody>
</table>

Conclusion

In 2014, RAS genotyping has become routine practice for the management of patients recently diagnosed with mCRC. The percentage of requests for genotyping in 2014 (80.1%) has increased since 2011 (81.1%).

For a large majority of patients (75.5%), the request for genotyping is done before or not later than one month after the diagnosis of the first metastases. However, for 24.5% of patients, the date of the request for genotyping, more than one month after the diagnosis, does not seem to be compatible with a fully informed decision on 1st line treatment.

New techniques for the assessment of RAS status currently being tested will probably reduce and homogenize the time required to obtain RAS status.

Disclosure/Acknowledgment

This study was funded by Merck Serono.

Disclosures: M. Ducrueux (Bayer, Amgen, Merck Serono, Sanofi, Roche, Novartis, Lilly, Pfizer); P. Arttu (Roche, Merck Serono, Aman, Sanofi); A. Livet (Merck Serono, Amgen, Roche, Sanofi); J.L. Merlin (Merck Serono, Amgen, Roche, Sanofi, Bayer); J.C. Sabourin (Merck Serono and Boehringer-Ingelheim, Roche, AstraZeneca); P. Laurent-Puig (Amgen, Boehringer, Merck Serono, Integragen)