Colorectal cancer: Increased life expectancy thanks to individualised therapies

An international comparative study with Kiel participation demonstrates advantages of precision therapies compared to standard treatments for certain cancers

In spite of intensive prevention and early detection efforts, colorectal cancer is becoming increasingly common, especially in industrialized nations. Health experts predict that this form of cancer globally could cause over a million additional deaths per year by 2030. This type of cancer, the second most common in Germany, is challenging because it grows without symptoms for a long time. By the time the disease is diagnosed, it is often too late for successful treatment. Given this challenge, scientists around the world are working on novel strategies to improve early detection on the one hand and to treat advanced stages of colorectal cancer better on the other. In the latter endeavour, standard treatments are generally offered to patients, but various individualized forms of therapy are gaining importance, which take particular account of the genetic predisposition of the patient.

Researchers from Kiel University, the University Medical Center Schleswig-Holstein (UKSH), Campus Kiel, and the Avera Cancer Institute in Sioux Falls, USA, together with an international research team, have published a comparative study of American and German colorectal cancer patients, comparing standard treatment protocols with a combination of standard and individual therapy. They come to the conclusion that patients with certain forms of advanced colon cancer lived on average 16 months longer thanks to supplementary individual treatment. The researchers from the Institute for Clinical Molecular Biology (IKMB) at Kiel University, together with their international colleagues, recently published their study in the current issue of the scientific journal Cancers.

Comparison of treatment guidelines

In order to make valid statements about the effectiveness of the various treatment strategies, the research team compared disease cases from the United States to a German patient group. First, the scientists made sure that the initial situation was comparable: All patients were affected by a form of stage III or IV colorectal cancer. Given the advanced stage of colon cancer with metastases in the liver, lungs or other organs, less than 20 percent of patients had a realistic prospect of successful treatment.

"Next, we recruited a group of patients of mainly northern European descent in the United States who were very similar to German patients in terms of ancestry," emphasizes the Kiel study leader, IKMB scientist Dr Michael Forster. "On this basis, we identified which disease courses resulted from the different treatment guidelines in Germany and the US," Forster continues.

A total of 108 patients were analysed. On the German side, 54 patients were divided into high-risk and low-risk groups based on the so-called mutation profiles. In the high-risk group, a particular combination of mutations is responsible for a rapid progression of the disease. Such a constellation generally only occurs in a few cases and the fourth stage of the disease also occurs relatively rarely due to improved preventive care. The German patients were treated according to European guidelines for this type of cancer and survived on average for 19 months after diagnosis.
Precision medicine in cancer therapy

The American patients in the study were initially also treated according to a standard procedure, which, however, already included more treatment options than in Germany. Their average survival was 33 months. In 35 patients, the standard protocol was followed by additional treatment tailored to the individual concerned, which was based on an assessment of the genetic and molecular profile of the tumor. The scientists' hypothesis was that especially patients with advanced stages of the disease and the associated complexity of the tumor needed treatment tailored to the tumor’s mutation profile. An interdisciplinary “Molecular Tumor Board”, composed of doctors and experts in molecular biology, bioinformatics and genetics, developed a specifically tailored treatment recommendation for each patient. This individual treatment may include a combination of multiple medications. The comparison of the two groups demonstrated that the individualised approach ensured that American patients survived on average for almost a year and a half longer, driven especially by improved survival of critically ill patients. Many experts see the future of cancer medicine in this more patient-oriented approach.

The present study shows the advantage of individualized forms of therapy in colorectal cancer treatment compared to standard procedures. The latter are based on empirical values from large numbers of cases and ensure the quality of treatment, but they do not always take sufficient account of the specific situation of the individual patient as a basis for decision-making when tailoring the treatment. The significantly higher life expectancy in the United States in a quasi-identical initial patient setting suggests that treatment guidelines can and should be improved across national borders. "The comparison of the treatment options, which differ significantly between the two countries, shows the great impact that personalized treatment can have on the individual life expectancy of patients," emphasizes Dr Tobias Meissner, Head of the Department of Experimental and Molecular Medicine at the Avera Cancer Institute. The work also confirms a general development in medicine, which is exemplified by the Schleswig-Holstein Cluster of Excellence "Precision Medicine in Chronic Inflammation" (PMI): In the field of inflammation research, researchers at Kiel University and its partner institutions are doing pioneering work in the development of precision medicine. Particular emphasis is placed on prevention. It is possible that individual therapeutic approaches will be effective in the future even before serious chronic diseases, including cancer or inflammatory disease, can develop.

An image is available for download:
https://www.uni-kiel.de/de/pressemitteilungen/2020/049-forster-mdpi-author.jpg
Caption: Dr Michael Forster from the Institute for Clinical Molecular Biology at Kiel University led the comparative study on colorectal cancer treatment in Kiel.
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