Colectomy associated with increased risk of diabetes

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People who have had a colectomy have increased risk of developing type 2 diabetes, according to a new study by researchers from the University of Copenhagen and Bispebjerg and Frederiksberg Hospitals. The

researchers hope their effort will pave the way to methods for preventing and treating the disease. The research results have just been published in the scientific journal *eLife*.

"We know that the colon houses large numbers of gut bacteria and hormone-producing cells, but we still do not know which role they play in regulating the blood sugar level. We hope our study will facilitate further research into the significance of the colon in blood sugar regulation and diabetes development," says co-author Kristine Allin, a physician at the Center for Clinical Research and Prevention at Bispebjerg and Frederiksberg Hospitals.

The study's first author, Postdoc Anders Boeck Jensen from the Novo Nordisk Foundation Center for Protein Research, has studied data from Danish registers of just over 46,000 patients who have either had the entire colon or parts of it removed. This data was compared to data of just under 700,000 comparable patients who, in the same period, had undergone surgery for something other than disease in the gastrointestinal tract. The study is an example of the use of real human treatment data generated by the healthcare system.

"The surgical procedures these patients have undergone represent the trial, and the results are then determined from the many data held in the Danish registers. Researchers often use animal testing to identify a connection before determining whether the results also apply to humans. Here, we are looking directly at surgery on humans, and we do not have to worry about whether the findings also apply to humans. The human as a 'model organism' is a concept that is gaining ground, ensuring that new patients benefit from experience and data collected through 20 years of treatment of previous patients," says co-author and Professor Søren Brunak from the Novo Nordisk Foundation Center for Protein Research.

The data studied by the researchers spans an 18-year period beginning at

the time of the operation. Patients who had the entire or left side of the colon removed showed increased risk of developing type 2 diabetes in the 18 years following the operation compared to patients who had undergone surgery in different parts of the body. Patients who had had the right or middle horizontal part of the colon removed showed no increased risk of developing diabetes.

This suggests that the left side of the colon plays a role in regulating the body's blood sugar level. The colon is full of gut bacteria and microbes, and some other studies indicate that a changed composition of these microbes, as occurs when part of the colon is removed in surgery, may play a role in the development of various diseases, aside from infections.

"The greater majority of the body's microbes are found in the colon, so it is relevant to look at what happens after the colon or part of it is removed. In a previous study, we saw no significant connection with the risk of developing cardiovascular diseases. We were therefore rather surprised to see so relatively massive an increase in the risk of developing type 2 diabetes. In fact, the increased risk corresponds to the effect of having three times as high a BMI," says co-author and Professor Thorkild I.A. Sørensen from the Department of Public Health and Novo Nordisk Foundation Center for Basic Metabolic Research.

More information: Anders B Jensen et al, Increase in clinically recorded type 2 diabetes after colectomy, *eLife* (2018). DOI: 10.7554/eLife.37420

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