

Embargoed to: Friday 9 July, 00.01 BST

Nicotine by-product can predict recurrence of cancer

A by-product of nicotine, found in the urine of smokers, could be used to identify when bladder cancer has returned, new research has found.

The pilot study, presented today at the 2021 European Association of Urology Congress, found that patients with high levels of cotinine were four times more likely to have their cancer return, compared to those with lower levels of the chemical. The researchers' goal is that a simple urine test for cotinine could reduce the number of invasive investigations that cancer patients undergo following diagnosis and treatment.

Cotinine is a chemical that is made by the body from nicotine, which acts as a marker for exposure to tobacco smoke. Smoking is a major risk factor for bladder cancer, but this is the first study to show how cotinine levels could be used to signal recurrence of the disease.

In non-invasive bladder cancer, where tumours are only found on the bladder lining, the cancerous tissue is surgically removed. For these low-risk cancers, there is no further treatment, but patients undergo regular cystoscopies every few months, where a camera is passed through the urethra into the bladder to check for further tumours.

The study, led by Dr Maher Abdessater and Professor Raghid El Khoury from the Notre Dame de Secours University Hospital in Lebanon, checked the cotinine levels of 135 patients who were attending hospital for follow up cystoscopies over an 18-month period. The only patients included in the study were those with low-risk bladder cancer, who had not received chemotherapy or radiotherapy and had no other condition, such as urinary infections, likely to distort the results.

Eighty of the patients had levels of cotinine consistent with heavy smoking: over 550 ng/ml. Three-quarters of these patients went on to develop cancer again, compared to just over 18 per cent of moderate smokers (with cotinine levels below 550 ng/ml). Some patients who identified as non-smokers or moderate smokers were found to have levels of cotinine in their urine consistent with heavy smoking.

Dr Abdessater said: "One of the major advantages of using cotinine is that it can be detected using a simple urine test, which is a cheaper and less invasive alternative to cystoscopy. It can also pick up where patients are not accurately reporting their smoking levels, or where passive smoking combined with active smoking is pushing them into the heavy smoker category."

"Although our sample size is small, the results to date show that cotinine could be a potential biomarker for recurrence of bladder cancer and is worth further investigation."

The findings reported at EAU21 today cover patients recruited between January 2018 and June 2019, but the study – run through the hospital's urology department – is still continuing. The study team is also actively looking for other hospitals around the world interested in collaborating on the research, to broaden the study out to a wider range of patients and healthcare systems.

Professor Arnulf Stenzl, from the University of Tübingen Medical Center, who is Secretary-General Adjunct of the EAU, said: "This study definitely gives food for thought, although as yet the findings are only in a small number of patients. We now need to test this in a larger trial, and also look at more precise indications of smoking levels and the type of cigarettes involved – particularly whether they are filtered or not. It would be interesting as well to look

at whether cotinine levels are higher in patients with other risk factors for bladder cancer, such as exposure to arsenic or industrial benzole.”

Ends

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Notes to editors:

About EAU21

Europe’s biggest urology congress will take place from 8th-12th July 2021 in a virtual setting. With over 1,500 abstracts presented and moderated live, the [Annual Congress of the European Association of Urology](#) (EAU21) will be amongst Europe’s biggest medical congresses in 2021.

Clinicians, scientists, and patients will meet to discuss topics such as:

- Prostate cancer: new developments to improve treatments of the most common male cancer
- Urinary incontinence: a growing concern for the elderly population
- Practice changing treatments for both bladder and kidney cancer
- Prevention and treatment of urinary stones; 1 in 10 people (55 million adults in Europe) will form a stone at some point
- Special track for representatives of patient advocacy group on Friday 9 July

...and many other conditions related to the male and female urinary tract system and male reproductive organs. Review the full scientific programme on the [congress website](#).