

Bladder cancer pilot study provides highly promising results

John McGrath has been a Consultant Urological Surgeon at the Royal Devon & Exeter NHS Trust since 2007. The majority of his clinical work focuses on patients diagnosed with bladder or prostate cancer. He offers a regional pelvic surgery service for patients in Devon, Somerset and parts of Cornwall. In 2012, he led the introduction of da Vinci Robotic surgery in Exeter and routinely performs robotically-assisted radical prostate removal and cystectomy (bladder removal). Mr McGrath is an Honorary Senior Lecturer at the University of Exeter Medical School where his research interests include surgical training in keyhole (robotic) surgery, improved medical care for patients undergoing pelvic cancer surgery and new tests for diagnosing bladder cancer. At a national level, Mr McGrath work as an advisor to NHS England and NHS Scotland and sits on research funding panels (NIHR) and the Academic Section of British Association of Urological Surgeons. He is married to Emily, a Consultant Dermatologist in Exeter, and they have two sons.

“Bladder cancer affects more than 10,000 people a year in the UK. The majority are diagnosed following the detection of blood in their urine. Some patients will see the blood themselves but others only know they have passed blood because they have had a medical check-up (a urine ‘dipstick’ test).

Once blood has been detected in a patient’s urine, their GP will refer them urgently to a specialist - a urologist - at the hospital. The next step usually consists of a kidney scan (an ultrasound) and a fibre-optic camera examination of the bladder (a cystoscopy). These are very reliable tests for detecting bladder cancer but some patients can find the camera examination uncomfortable or invasive. Although nine out of 10 patients turn out not to have cancer, they currently still have to undergo these tests to be certain.

In more recent years, there has therefore been a lot of interest in cancer biomarkers - a substance that can be detected in normal bodily fluids such as urine, saliva or blood and reliably indicates whether or not a patient has a certain type of cancer. In many ways, bladder cancer should be one of the most amenable cancers to a scientific breakthrough in this field as the cancerous growth sits within urine in the bladder. We would reasonably expect some of the cells or ‘waste products’ to wash out in a patient’s urine when they go to the toilet. If we could find out what these substances are and how to detect them in the lab, we could potentially create a test that avoids the need for patients to undergo examinations such as ultrasound or camera examinations in their bladder. This could even be a urine test at home that is sent to the hospital for analysis.

We therefore formed a research group with the University of Exeter (Dr Hannah Florence) and the Clinical Research Facility at the RD&E (Dr Gill Baker) to undertake some preliminary work in this area.

The University team from Exeter Biosciences has brought its expertise to the group in the field of metabolomics and mass spectrometry. This state-of-the-art technique has allowed us to study the ‘waste products’ in urine samples from patients recently diagnosed with bladder cancer and to compare them to those patients without bladder cancer. In doing so, we have been able to determine if there are differences in the patterns of these substances that would allow us to detect bladder cancer on a simple urine test.

With generous funding from FORCE and the support of local patients, we have now completed a successful pilot trial (an early assessment) of the technique in approximately 40 patients and found extremely promising results. Our preliminary findings suggest the technique may be able to identify patients who have a tumour in their bladder but we now need to do further research by recruiting a larger number of patients into the study and further refining the test.

In addition, we have widened our research team to include Professor Nick Stone from the University of Exeter. He has an international reputation in another novel technique known as Raman spectroscopy, another new and exciting way of using light to examine the very smallest waste substances in the urine and again assess whether their pattern differs between patients.

Our aspiration as a research team is to be able to contribute to the scientific development of a simple urine test, potentially delivered at home, that would allow patients and their GPs to decide if bladder cancer is likely in that individual and whether further medical tests are beneficial.”