

Database to revolutionise UTI care for children

Many women and children who suffer ongoing UTIs lack effective treatment, with medicine failing to acknowledge chronic infection. Now science is finally catching up with the experience of millions of patients.

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Australia will become the first country to establish a patient database of children suffering [urinary tract infections that fail to be eradicated by antibiotic treatment](#), and evidence is growing stronger that highly prevalent chronic infections are routinely not being recognised by medicine.

University of Sydney researchers have published the world's first case study of a child infected with bacteria in the cells of the bladder wall, where the bacteria could not be reached by antibiotics, in a highly significant addition to the medical literature that has formed the basis for ongoing research as to the causes of chronic UTI.

Most doctors are unaware that bacteria can penetrate the wall of the bladder to form intracellular communities where pathogens hide, only to be released into the bladder after a course of antibiotics ceases, resulting in a [recurrence of UTI infection](#).

This is despite the phenomenon of embedded infection being recognised by science based on laboratory studies two decades ago.

Women and children who suffer ongoing UTI symptoms often are told they are simply susceptible to these infections and should drink more water or look after their hygiene better. Sufferers are prescribed several rounds of antibiotics that do nothing to treat the underlying chronic infection.

Prophylactic antibiotics often are prescribed in a half-dosage regimen, but patients report this does not treat or prevent chronic infections in the long term and exacerbates antibiotic resistance.

A case report of a 14-year-old girl from Sydney who suffered debilitating chronic UTI symptoms, cared for by the Children's Hospital at Westmead pediatric urologist Aniruddh Deshpande, has been [published in the journal of the American Society of Microbiology and now presents the first example in the world in published academic literature of long-term persistence of urinary bacterial infection going undetected in a severely symptomatic adolescent](#).

The girl had suffered more than six years of persistent UTI symptoms and associated urinary incontinence, and had been treated repeatedly with antibiotic courses that provided only temporary relief.

Professor Deshpande performed a cystoscopy, which allowed him to see inside the patient's bladder, where he found severe inflammation and altering of the cells of the bladder wall. Subsequent urinary analysis identified extensive intracellular bacterial

communities embedded within urothelial cells – the first time in the world embedded bacteria had been identified in the bladder cells of a patient with chronic UTI.

These intracellular communities within cells are hypothesised to form bacterial reservoirs that seed further urinary reinfection when antibiotics are ceased.



Associate professor Aniruddh Deshpande is leading research of urinary tract infections at the Children's Hospital at Westmead. Picture: John Feder

“This is the first report demonstrating long-term undetected intracellular bacteria communities in a severely symptomatic child with chronic UTI,” the case report states. “It underscores the need to learn more about intracellular bacteria and urinary tract biofilms that are protected from antibiotics and host immunity.

“Current diagnostic and treatment standards for recurrent and/or chronic UTIs may not detect persistent IBC reservoirs and provide ineffective antibiotic therapy. This highlights the critical unmet need for the development of specific diagnostics that can detect the presence of IBCs.

“Moreover, patients with persistent IBCs must be treated as distinct from those with uncomplicated recurrent UTIs, given the differences in underlying pathology and treatment.

“This case study provides a template for future studies on severely symptomatic young females whose UTI symptoms are only temporarily alleviated by standard treatments.”

One Tasmanian mother, who wants to be known only as Erin and who has experienced the devastation of chronic UTI in her child, has described medical treatment of children with the condition as providing only a Band-Aid. Erin’s nine-year-old daughter has suffered ongoing UTI almost continually for two years.

“It is just not good enough,” Erin said. “It just baffles me that prescribing continual separate courses of antibiotics is considered appropriate treatment, which is just Band-Aiding a child.”

Professor Deshpande has opened the world’s first pediatric clinic to treat chronic UTI at the Children’s Hospital at Westmead. Researchers are urging general practitioners to arrange to have their pediatric patients, aged under 15, who experience persistent UTIs to be placed on a newly created database that is aimed at understanding why people develop chronic UTI.

The research team hopes the new database will help them explore whether immune system evasion or genetic predisposition could explain why some children develop chronic UTIs while others don’t. Inflammatory immune markers have been identified that could hold part of the key to why bacteria are more readily able to penetrate the bladder wall in some patients.

“The issue of chronic UTIs is so under-recognised in the clinical setting,” said research team member Arthika Manoharan, a microbiologist at the University of Sydney. “We are first trying to come up with the numbers to show that this is a real problem.

“Even though this phenomenon of embedded infection within the bladder wall was first documented about almost two decades ago, a lot of clinicians, GPs in particular, don’t appreciate the fact that patients that have come back with UTIs again and again can have these intracellular reservoirs.

“And the longer these intracellular reservoirs persist in patients, the worse the chronicity of the infection gets and the more antibiotic resistance there is as well. And the issue is that a lot of the antibiotics we use for our daily UTI treatments can’t get into these host cells.”

Urinary tract infections are responsible for a large and rising global disease burden, with more than 400 million infections reported annually. It has been estimated that about 40 per cent of children with UTIs will suffer recurrent episodes despite successful antibiotic treatment and many will go on to suffer chronic UTI with debilitating symptoms for years.

Women are suffering the condition in large numbers together with severe disability, and many receive ineffective treatment.

Patient advocacy group [Chronic UTI Australia has recently launched a national campaign called Take Action](#) to push for the recognition of chronic UTI as a medical condition, the updating of testing and treatment guidelines, and the formation of specialist chronic UTI clinics.

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