Where there is no laboratory, a urine patch test helps diagnose meningitis

Bacterial meningitis (BM) is 10 times more common in low-income settings than in well-resourced centres.[1] It is a medical emergency and delay in treatment may lead to neurological damage or death. But to start treatment requires a diagnosis and the gold standard for making the diagnosis is the laboratory examination of a sample of cerebrospinal fluid (CSF) for leucocytes, protein and glucose levels, and culture. Bacterial meningitis is common where laboratory facilities are often unavailable or inadequate and a simple, reliable and accurate diagnostic bedside-test would be invaluable. There are several reports of urine patch tests being used to diagnose BM.[2-4] The results of testing CSF with patches on urine dipsticks for glucose, protein and leucocyte esterase have been compared with laboratory examination of CSF and the specificity and sensitivity of the patch-tests in identifying cases of BM and tuberculous meningitis are reported as excellent. Differentiating between BM and tuberculous meningitis may not be reliable and results for aseptic meningitis are less accurate.[2-8] Urine patch tests made by different manufacturers have been used with success. Moosa *et al*. using the Combur-9 urine test patches missed 2 of 69 cases of BM but had no false positive results.[4] Molyneux, *et al*., tested the Multistix 10 with similar results and in this journal Joshi *et al*., report their findings in comparing the Combur-10 with standard laboratory CSF tests.[3,5] Unlike in previous studies, Joshi *et al*., quantified the patch test findings to assess cut-off points for levels of protein, glucose and leucocytes.[5]

The nitrite patch on the urine dipstick will test positive in the presence of leucocytes that have not released leucocyte esterase and may enhance the sensitivity of the patch tests in identifying cases of BM.[6] The leucocyte esterase patch identifies granulocytes, which is why it is not a sensitive test for aseptic meningitis, in which monocytes usually predominate.[7]

Where HIV is endemic and cryptococcal meningitis are common, neither the patch tests nor routine laboratory examination of the CSF will identify infections reliably.

The first thing a clinician does with a sample of CSF is to look at it for turbidity. If the CSF is hazy or cloudy the clinician will assume that the sample contains white cells and will treat for BM. A bedside patch test merely confirms his suspicions. If the test is negative he will ignore it and still give antibiotics. If the sample is blood stained it makes a patch test difficult to interpret, as the test relies on colour changes of the patch to give results.[8]

A CSF sample can look clear but still contain up-to 200 cells/mm^3 and it is in this circumstance that a bedside test is particularly useful.[7]

In most cases a lumbar puncture is done to exclude BM and a 'negative' patch test on a clear CSF sample is good evidence not to start antibiotic therapy for BM. If there is strong clinical suspicion of BM (such as a stiff neck in a febrile child) then antibiotics should be given.

This study by Joshi *et al*., adds to the small body of literature on the use of urine patch tests to diagnose CSF infections. The authors have quantified the results from one of the commercial urine dipsticks and recommend that a CSF patch test be manufactured with only the relevant patches on it. I doubt if such a test would be cheaper as its commercial interest would be less than for urine dipsticks. It would have been interesting for Joshi *et al*., to have recorded the appearance of the CSF and correlated their quantitative finds with the appearance. Would they have been able to separate blood stained from infected CSF samples? Nevertheless they remind us all that even in circumstances where laboratory expertise is not available a cheap, effective test is at hand and should not be ignored.

Access this article online	
Quick Response Code:	Website: www.ruralneuropractice.com
	DOI: 10.4103/0976-3147.112729

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How to cite this article: Molyneux E. Where there is no laboratory, a urine patch test helps diagnose meningitis. J Neurosci Rural Pract 2013;4:117-8.
Source of Support: Nil. **Conflict of Interest:** None declared.