

- ⁵ Hellerstein S, Kennedy E, Nussbaum L, Rice K. Localization of the site of urinary tract infections by means of antibody-coated bacteria in the urinary sediments. *J Pediatr* 1978;**92**:188-93.
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The authors reply as follows:

We agree with Howie and Burdon that the criteria for selection of the patients can influence the outcome of a study on the differential incidence of antibody-coated bacteria (ACB) in upper and lower urinary tract infection (UTI). However, they state that we 'repeated the claim' that a test for ACB in the urine can differentiate between pyelonephritis and cystitis. This is not true since we limited ourselves to report a clinicopathological correlation on statistical grounds.

In our opinion, the phenomenon of ACB is due to secretory antibodies in urine. These are produced by plasma cells which have accumulated in the lamina propria, and this process can become operative at any level along the urinary tract. The local immune response in lower UTI is qualitatively similar to that which can be found in upper UTI, although it is less frequently detectable. The higher frequency of ACB detection in the group of patients with pyelonephritis may be explained by a stronger antigenic stimulation in this condition. Accordingly, elevated urinary levels of specific antibodies have been found in 22 of 23 episodes of pyelonephritis and in 15 of 47 episodes of cystitis by means of sensitive radioimmunoassay.¹

Bearing these considerations in mind, the number of false-positive results depends on two main factors. The first is the heterogeneity of the lower UTI group, which includes subjects with asymptomatic bacteriuria and subjects suffering from a long-standing symptomatic UTI associated with demonstrable urological abnormalities. In fact, the percentage of ACB detection in the latter condition in our study is approximately three times higher than in the asymptomatic bacteriuria subgroup.

The second factor is the sensitivity of the assay procedure. In this regard, the quality of the fluorescent antibody is important. To obtain the best diagnostic

discrimination between upper and lower UTI, every batch should be tested and appropriately diluted. In connection with these arguments, one problem encountered in analysing the data from various investigative groups is the lack of uniform criteria for what constitutes a urinary sediment that is positive for ACB.²

The proportion of false-negative results in the pyelonephritis group seems less prone to be influenced by minor variations in the sensitivity of the assay. This is probably due to the greater uniformity of the local antibody production, provided that the members of this group are selected on the basis of stringent criteria (definite evidence of urographic supraventricular obstruction, persistent significant bacteriuria, chronic clinical course). In a study made in a large, unselected population with bacteriuria, an abnormal intravenous pyelogram was the single most common finding in the ACB-positive group.³

Direct invasive methods to localise the site of UTI are attended by increased risks and discomfort to the patients.⁴ In addition, the bladder washout test provides a substantial number of indeterminate, equivocal results.⁵

The functional and anatomical integrity of the renal tubule can be evaluated indirectly by assaying various urinary proteins (muramidase, *N*-acetyl- β -glucosaminidase, LDH isoenzyme V and β_2 -microglobulin). Upper and lower UTI can be discriminated by these assays, and there is a fairly good consistency with the ACB test.⁶⁻⁸ Nevertheless some degree of overlap was observed for every protein marker studied.

A simple, reliable, non-invasive test to differentiate between infections of upper and lower urinary tract is still awaited. In this context the search for ACB could play an important role.

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