

19 EXPERIMENTAL PYELONEPHRITIS IN CONGENITAL UNILATERAL HYDRONEPHROSIS IN THE RAT. Craft, J.C., Boineau, F. G., Daum, R.S. & Lewy, J.E. Tulane University School of Medicine, New Orleans, LA, USA.

A streptomycin mutant of *Escherichia coli* strain C94 [07:K1: H-] (C94/sm) representative of the most common capsular type observed in neonatal sepsis and meningitis, and childhood pyelonephritis (PYE) was used to develop a model of PYE. Intraperitoneal (IP) inoculation of normal 21 day old Wistar rats with 10^7 CFU/ml of C94/sm produced bacteremia persisting for 24 to 72 hours in 80% of the rats. Kidney infections of 10^2 to 10^3 CFU/ml were observed in all bacteremic rats for 4 to 14 days. Urine cultures were uniformly negative. Unilateral palpation of the kidney during bacteremia did not appear to have any effect on the degree of infection in normal Wistar rats.

IP inoculation of 10^7 CFU/ml of C94/sm in congenital unilateral hydronephrotic male Wistar rats produced similar results as above except that the right kidney had a 1-2 log greater bacterial concentration per ml than the left kidney. Palpation of the right kidney during early bacteremia resulted in gross changes in the right kidney evident in less than 72 hours. Bacterial counts of the right kidney exceed the left by 2-4 logs and urines were uniformly positive with $> 10^6$ CFU/ml. Experimental PYE in the congenital unilateral hydronephrotic rat appears to be a reproducible model for the study of this disease.

20 PROTECTION AGAINST ACUTE, ASCENDING PYELONEPHRITIS CAUSED BY E.COLI IN RATS USING ISOLATED CAPSULAR ANTIGEN CONJUGATED TO A CARRIER SUBSTANCE.

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Purpose of study. Earlier we have shown that K antibodies are important for protection against acute pyelonephritis in rats. So far, only whole bacteria have been used to induce such protective antibodies, as isolated E.coli capsular antigen is non immunogenic. The aim of the present investigation was to study if a protective effect could be shown after immunization with isolated E.coli K antigen conjugated to a carrier substance.

Methods. E.coli K13 antigen, conjugated to a carrier substance to make it immunogenic, was used for immunization of Sprague-Dawley rats. Acute, ascending pyelonephritis was then induced in immunized and non immunized rats by intravesical injection of 10^8 E.coli O6K13H1 bacteria.

Results. Rats immunized with two subcutaneous or two intraperitoneal injections (2.5 µg/injection/rat) had less often acute pyelonephritis after the bacterial injection, than the non immunized controls (50% compared to 87%; $p < 0.01$).

Conclusion. The present investigation has shown for the first time that isolated E.coli K13 antigen, conjugated to a carrier substance, can be used for prophylactic immunization against acute pyelonephritis.

21 PARTIAL URETERIC OBSTRUCTION IN NEWBORN RATS: LONG-TERM EFFECTS ON THE KIDNEY. S:t Görans Children's Hospital S-112 81 STOCKHOLM and Biomedical Centre, S-752 37 UPPSALA, Sweden

Despite that ureteric obstructions in children are usually partial, this type of obstruction has been studied only sparsely. Knowledge is almost completely based on studies of total obstructions in adults.

A partial obstruction of one ureter was created in newborn rats. At adult age, a considerable hydronephrosis had appeared. The parenchymal weight was reduced by 8 %, the blood flow (86 - Rb - ex-traction) by 12 %. These decreases were uniform in all zones of the kidney; in the outer medulla, however, the flow was somewhat increased. The GFR was decreased only 20 % (a true value as the considerable dilution in the dilated pelvis was taken into consideration!). There was no correlation between pelvic volume and parameters studied. - The reductions were completely compensated for by the contralateral kidney.

The changes of pelvic volume and parenchymal weight were found to progress during the first weeks only.

Thus, in this preparation, a partial ureteric obstruction seems to cause only moderate kidney damage, progressing only during the first weeks, compensated completely for by the contralateral side, and not correlated to size of pelvis.

22 PLASMA RENIN IN CHILDREN AFTER SURGICAL RELIEF OF OBSTRUCTIVE UROPATHY AND IN NORMAL CHILDREN Eke, F.U.; Currie, A.B.M.; Das, V.K.; Clogher, L.; Gosling, P.; Winterborn, M.H.

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Supine plasma renin was measured in children aged 7 to 18 years, whose obstructive uropathy was relieved surgically 2 to 11 years previously. Values did not differ significantly from age matched controls in 14 children.

One patient studied 11 years after surgical relief of his obstruction had a high renin level.

It has been suggested that renal ischaemia may persist after relief of hydronephrosis. Our results show that while this may occur 10 years or more following surgical relief of obstruction, hyperreninaemia rarely occurs within 2 to 10 years of effective surgical relief.

It may therefore be important to monitor children who have had operation for relief of hydronephrosis, looking for evidence of renal ischaemia and possibly renovascular hypertension more than 10 years after surgery.

23 ATTACHMENT TO URINARY TRACT EPITHELIUM - A VIRULENCE FACTOR IN URINARY TRACT INFECTION. Svanborg Edén, C.

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The ability of *Escherichia coli* strains isolated from children with various forms of urinary tract infection to attach to urinary tract epithelial cells *in vitro* relates to the severity of UTI produced by the strains *in vivo* (1). The aim of the present study was to clarify which structures on the bacteria bound to receptors on the epithelial cell surface.

Methods: Attachment to human urinary tract epithelial cells *in vitro* (2), Purification of pili (3), Isolation and characterization of glycosphingolipids (4).

Results: A glycosphingolipid receptor on the urinary tract epithelial cells was identified. Several strains and their isolated pili were tested for binding to this receptor.

Conclusion: Attachment to urinary tract mucosa is a specific process involving surface ligands and epithelial cell receptor. The density of receptors may be a host factor determining susceptibility to UTI.

References: (1) Svanborg Edén et al. Lancet II:490,1976, (2) Svanborg Edén et al. Infect.Immun. 18:767,1977, (3) Korhonen et al. Infect.Immun. in press 1980, (4) Leffler and Svanborg Edén FEBS Lett. in press 1980.

24 Hemagglutination of human erythrocytes by uropathogenic *E.coli*

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Adhesion of uropathogenic *E.coli* strains to periurethral (PU) and uroepithelial cells has been shown to be correlated to a specific mannose-resistant hemagglutination of human erythrocytes (MRHA_{hum}). Freshly isolated uropathogenic and control faecal *E.coli* strains were therefore investigated for agglutinating capacity of erythrocytes of various species. All (n = 14) pyelonephritic strains agglutinated human erythrocytes but not those of ox or guinea pig. Strains causing asymptomatic bacteriuria and faecal strains from healthy individuals showed a low incidence of this hemagglutinating pattern, and cystitis strains an intermediate frequency. In all cases the MRHA_{hum}-property was closely correlated to an increased adhesive capacity to PU-cells. EM findings indicated that pili mediate the adhesion. These pili are not type 1 pili. Thus, the MRHA_{hum} is likely to reflect a specific, surface-associated virulence property of these strains, which may be a prerequisite for the development of pyelonephritis.