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Influence of Virulent Strains of Staph aureus in Pathogenesis of Exit site Infection in Peritoneal Dialysis

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To examine the influence of clinical strains of Staph.aureus (SA), with different virulence, for inducing exit-site infection (ESI) and peritonitis in peritoneal dialysis (PD), we used a rabbit model of PD. Three different clinical strains of SA were obtained from PD patients. The virulence of SA strains was mild, moderate and severe. Our objective was to relate the degree of ESI produced by different strains of SA and peritonitis induced before after PD treatment, following the inoculation of SA at the exit site. We introduced PD catheters in NZW rabbits by midline abdominal incisions at Day 0, and injected freshly prepared inoculum of 3 different strains of SA (1x104 cfu/ml) at Day 3, 5 and 7 at the catheter exit site, to induce ESI. We used six rabbits for each strain of SA for a total of 18 rabbits. After SA inoculation, we divided the rabbits into two: Group A: rabbits were dialysed from Day 10 14; Group B rabbits were NOT dialysed and followed from Day 10 14. All rabbits were sacrificed on Day 14. Tissues from exit site, peritoneal cavity and PD effluents were examined at necropsy by histologic and microbiologic cultures with identification of SA strains. Results indicate that all dialysed and nondialysed rabbits developed significant ESI (GrA: 1.3+ 2.0 x 105 cfu/gm: and GrB; 1.4 + 2.7x105 cfu/gm;($p = 0.035$) irrespective of the virulence of SA used. Peritonitis, as detected from histologic and microbiologic examination of peritoneal tissues (cfu/gm) and fluids (cfu/ml), occurred in all dialysed rabbits (Group A) and only in 2 of the non dialysed (Group B) rabbits ($p = 0.001$). We conclude that SA inoculation at exit site causes ESI irrespective of the virulence of clinical strains, but peritonitis by SA from the exit site is facilitated by PD process.