
Bacterial infections associated with double lumen central venous catheters

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Abstract

Central venous catheters were a major advance in end-stage renal disease patient care until the burden of catheter related complications became obvious.

A retrospective study on infections complications of the double lumen catheterisation of central veins for haemodialysis and PD was done in 2004 year. In period from January to December 2004, 60 catheters were placed. 55 patients had double lumen, one for plasmapheresis and 54 for haemodialysis. The mean duration of catheters remaining in situ was 36.67 days (range 7 - 145 days). There were 7 double lumen catheters placed with cuffs and tunellisation, and the other 48 patients had catheters of a short duration. Routine smears were taken from the top of catheters after extraction, and from the skin surrounding the place of catheter insertion. Hemocultures were also taken, and smears from periphery (smears from pharynx, nose and urinoculture). Reasons for placing catheters were acute renal failure in 19.65%, end stage renal disease in 35.71%, and complications of permanent vascular access in 44.64%.

In 2155 patients, *Staphylococcus aureus* and *Enterococcus* species were isolated from the top of dialysis catheter, after extraction, and without positive blood bacterial cultures. In a few patients micro-organisms were isolated from periphery on skin changes 2155, urine 2155, pharynx 1155. Prophylaxis with antibiotics was administered in 18155 patients, with antibiotics from group of cephalosporin and chinolone over next 7 to 14 days. Mortality during the period of observation was 7155 patients.

The conclusion based on the aforementioned parameters is that duration of placed catheters did not correlated with the frequency of infections. The respect of the surgical principles of asepsis and disinfection has contributed to a decreased frequency of catheter infections for dialysis.

Key words: central venous catheter, bacterial infection, hemoculture, urinoculture

Introduction

Central venous catheters were a major advance in end-stage renal disease (ESRD) patient care until the burden of catheter related complications became obvious. Catheter-related infection is one of the major causes of morbidity, with potential lethal hazards in haemodialysis patients. Today, the incidence of bacteraemia ranges from 0, 5 to 13 per 1000 patient - days with haemodialysis catheters (1). According to data from the last register of dialysis treatment and transplantation of kidneys in Serbia and Montenegro, an

increase of hospitalised patients with vascular problems was noticed. More precisely, every fifth haemodialysis patient was hospitalised due to a vascular problems (A-V fistula thrombosis, malfunction, infection or moving from CAPD to HD) (2). Haemodialysis catheters are indicated in two types of situation: first, short term solution to permit creation, maturation or revision of arteriovenous fistula or graft, second, long term solution for patients with exhausted vascular access sites and with contraindications for arteriovenous access due to medical reasons such as heart failure, severe limb ischaemia or to provide comfort in elderly patients with poor prognosis. Today, an estimation is that 13% of patients with end-stage renal disease are regularly treated with permanent or temporary central catheters. The catheter insertion site plays a significant role in the magnitude of the infectious risk. The femoral route is apparently less favourable than subclavian or jugular route, (1-3).

Patients and methods

A retrospective study of complications caused by infections of central venous catheters for haemodialysis was done in University Hospital in Novi Sad, Department of Nephrology in 2004. In the period from January to December 2004, 60 catheters were placed. 55 patients had central venous catheter, one of them because of plasmapheresis and 54 because of haemodialysis. The duration of catheter placement averaged 36,67 days (shortest 7 days, longest 145 days). There were 7 patients with long term cuffed tunnelled catheters and 49 patients had short duration catheters. Insertion site of short time catheters was: v. jugularis 28, v. subclavia 19, and v. femoralis 2. During the treatment 39 patients had 1 catheter, in 2 patients 3 catheters were changed and in 1 patient 4 catheters were changed.

Results

Smears were taken from catheter tips after extraction, and from the skin surrounding catheter insertion place. Blood cultures and smears were also taken from periphery (smears from pharynx, nose and urinoculture). Indications for placing catheters were acute renal failure in 19.65%, ESRD in 35.71%, and complications of permanent vascular access in 44.64%. In 2/55 patients, *Staphylococcus aureus* and *Enterococcus* species were isolated, from catheter tips after extraction, but without positive blood cultures. In a few patients *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, and *Klebsiella pneumoniae*, were isolated from periphery (skin changes 2155, urine 2155, pharynx 1155).

Prophylaxis with antibiotics of cephalosporin and chinolone groups lasting 7 to 14 days was administered in 18 (32,2%) patients. 8/55 patients (14,5%) were treated with antibiotics according to antibiogram. 29 patients were left without antibiotic therapy. Mortality during this period of observation was 7/56 patients.

Conclusions

According to presented data, the conclusion is that duration of catheterisation period did not correlate with increase of the infection frequency. The number of patients dialysed with catheters is increased in the last few years, together with catheter related complications, especially bacteraemia, that became leading cause of morbidity and mortality. Obedience of surgical principles of asepsis and disinfection (sterile gloves, masks, galoshes, skin preparation for catheter insertion, appliance of disinfection means when disconnecting and connecting the catheters) evidently

contribute to reduction of frequency of haemodialysis infections.

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