



## A STUDY ON CATHETER RELATED INFECTION IN HEMODIALYSIS IN TIRUNELVELI

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### ABSTRACT

**Background:** Haemodialysis is a procedure to remove extra salt, fluids and toxins through a dialysis machine. Central venous catheters are frequently used to initiate the dialysis before the arteriovenous fistulas mature and start functioning. Catheter related blood stream infection is the most common indication for the catheter removal.

**Aim of the study:** To study the incidence of temporary vascular catheter related infection in haemodialysis patients and to study the most common risk factors for catheter infection. Also to study about the bacteriological profile of catheter related infection.

**Methods:** This is a prospective study done for one year from June 2017 to June 2018 in Tirunelveli medical college. About 75 patients undergoing haemodialysis via central venous catheters were included in the study. Patients with signs of catheter related infection like fever, chills, hypotension, local catheter site infection were subjected to blood culture and catheter tip culture.

**Results:** Totally 75 patients with central venous catheter for haemodialysis were studied. Among 75 patients, 37 patients had Diabetes, 60 patients had chronic kidney disease. Regarding the type of venous access, 56 of them had femoral vein catheterization, 19 had jugular vein catheterization. 39 patients had febrile episodes, hypotension occurred in 33 individuals during dialysis. Blood culture positivity was observed in 23 patients. The most common organism isolated was gram positive staphylococci aureus followed by gram negative klebsiella and pseudomonas. Culture from catheter tip by semi quantitative method showed growth in 23 patients.

**Conclusion:** From our study, we come to a conclusion that there is no significant association between the site of catheter insertion and blood stream infection. Patients with Diabetes, hypoalbuminemia has significant association with the blood culture positivity for infection.

### KEYWORDS : Hemodialysis, Catheter related infection

#### Background:

Sepsis related death is more common in dialysis patients than the general population. Bacteremia complicates the central venous catheter use in haemodialysis patients. Catheter related infection is suspected based on the clinical profile of the patients like fever, chills, rigor, unexplained hypotension, altered mental status, local catheter site abscess, induration around the exit port site. Catheter related blood stream infection is the most common indication for the catheter removal. Contamination of skin flora, unsterile handling of catheter by the training personnel, malnutrition, Diabetes, malignancy, hypoalbuminemia, increased duration of catheter all predispose to the high chances of catheter related infection.

**AIM :** To study the incidence of temporary vascular catheter related infections in haemodialysis patients. To study the most common risk factors for catheter infection and to study about the bacteriological profile of catheter related infection.

**MATERIALS AND METHODS :** Patients undergoing haemodialysis via central venous catheters in the dialysis unit of our institution were included in the study.

**Duration of study :** 1 year

**Type of study :** Prospective study

**Sample size :** 75

**Inclusion criteria:** 1. patients undergoing haemodialysis via central venous catheters

**Exclusion criteria :** 1. patients undergoing haemodialysis via arteriovenous fistula 2. patients with cellulitis and other focus of infection  
**Methodology:** Demographic data and clinical variables including age, sex, duration of dialysis, site of catheter insertion, diabetes, and nutritional status for each of the patients were collected at the initial visit. Patients with symptoms and signs of catheter related infection like fever, chills, hypotension, local catheter site infection are subjected to blood cultures. One from the peripheral vein and the other from the central venous access. Catheter tip were also subjected to semi quantitative analysis in sterile container.

#### Catheter insertion site

| Catheter site | Frequency | Percent |
|---------------|-----------|---------|
| Femoral       | 56        | 74.7%   |
| Jugular       | 19        | 25.3%   |
| Total         | 75        | 100.0   |

#### Catheter site skin swab culture

| Culture  | Frequency | Percentage |
|----------|-----------|------------|
| Positive | 31        | 41.4       |
| Negative | 44        | 58.6       |
| Total    | 75        | 100        |

#### Catheter site skin swab culture

| Culture  | Frequency | Percentage |
|----------|-----------|------------|
| Positive | 31        | 41.4       |
| Negative | 44        | 58.6       |
| Total    | 75        | 100        |

#### Type of Organism

| Type of organism | Frequency | Percent |
|------------------|-----------|---------|
| S.aureus         | 13        | 17.3%   |
| Klebsiella       | 7         | 9.31%   |
| Pseudomonas      | 3         | 3.99%   |
| Total            | 23        | 30.6%   |

#### Catheter tip culture

| catheter tip culture | Frequency | Percent |
|----------------------|-----------|---------|
| Negative             | 52        | 69.3%   |
| Positive             | 23        | 30.7%   |
| Total                | 75        | 100.0%  |

#### Type of organism in catheter tip

| Type of organism | Frequency | Percent |
|------------------|-----------|---------|
| S.aureus         | 14        | 18.7%   |
| Klebsiella       | 9         | 12.0%   |
| Total            | 23        | 30.7%   |

#### DISCUSSION:

To identify the predisposing factors, we studied 75 patients out of which 82.7% are male and 37 patients had comorbidities like diabetes. Among 75 patients 60 patients had chronic kidney disease as the indication for dialysis. Regarding the type of venous access, 56 patients had femoral vein catheterization and 19 patients had jugular venous access. 38 patients had catheter duration of more than 14 days. Out of 75 patients, febrile episodes occurred in 39 patients and hypotension in 33 individuals. Local catheter site infection occurred in 32 patients and swab culture from catheter site showed growth in 31 patients. Blood culture from both central venous access site and peripheral vein showed growth of bacteria in 23 patients. The most

common organism isolated from the blood culture was gram positive staphylococcus aureus(17.3%) followed by klebsiella (9.37%) and pseudomonas(3.99%)Culture of the catheter tip by semi quantitative method showed growth in 23 patients , among them the common organisms are gram positive. From our study ,we come to a conclusion that there is no significant association between the site of catheter insertion and catheter related blood stream infection in contrast to Lemaire et al .Out of 23 patients who are positive for blood culture, 17 patients had catheter infection in the catheter site.(P value= $<0.001$ ). So there is a significant association between catheter site infection and blood culture positivity. Among 23 patients who are positive for blood culture, 19 patients had febrile episodes(P value= $<0.0001$ ). So there is a significant association between febrile episodes and blood culture positivity. Out of 23 patients who are positive for blood culture, 17 patients had catheter more than 14 days.(P value= $<0.007$ ). So there is a significant association between duration of catheter insertion and blood culture positivity. Among 23 patients who are positive for blood culture, 18 patients were found with serum albumin less than 3.(P value= $<0.0001$ ). So there is a significant association between hypoalbuminemia and blood culture positivity. Out of 23 patients who are positive for blood culture, 21 patients were diabetic.(P value= $<0.0001$ ). So there is a significant association between Diabetes and blood culture positivity From our study we concluded that, Patients with diabetes and hypoalbuminemia ,prolonged duration of catheter ,local catheter site infection, and patients with febrile episodes during the haemodialysis has significant association with the blood culture positivity compared to previous studies. Catheter related infection and blood stream infection during haemodialysis is more with patients in Diabetes, malnutrition,and prolonged duration of catheter

#### CONCLUSION:

Out of 75 patients who were randomly selected based on the inclusion and exclusion criteria, the following results were observed, Blood culture positivity was observed in 23 patients out of 75 patients who had central venous catheter for haemodialysis (30.7% incidence). The incidence of catheter related infection and blood stream infection is 30.7%. The most common organism isolated was Gram positive organisms mainly Staphylococcus aureus followed by Gram negative organisms Klebsiella. Catheter related infection and catheter related blood stream related infections showed significant association with the diabetes, hypoalbuminemia, local catheter site infection and prolonged duration of catheterization

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