Retrospective analysis of catheter related bloodstream infection in 11014 patients with central venous catheter

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Background:

Central venous catheter is widely used in clinic,such as being suitable for long-term and a large number of rehydration and peripheral vein used difficultly, intravenous high nutritional therapy, the application of anti-cancer drugs, central venous pressure measurement, etc. However, the associated complications -- catheter-related blood stream infections (CRBSI) also increase year by year. CRBSI includes bloodstream infection, catheter implantation infection and local infection. That is acute onset and high mortality..It has been reported that the iatrogenic infection rate of central venous catheter is 0.21 % ~ 3.02 %.The occurrence of CRBSI not only aggravates the suffering of patients, but also significantly increases the medical expenses, lengthens the length of stay in hospital and attracts increasing attention from nursing colleagues.This study retrospectively analysis four years CVC patient data of our department, aims to explore the incidence, etiology CRBSI characteristics and related risk factors.

Methods:

Clinical data the hospital's hepatobiliary surgery department had a total of 23,249 patients hospitalized for 4 years from January 2014 to December 2017, with 299,125 days of hospitalization.There were 11014 patients with central venous puncture and retention for 123905 days, and the utilization rate of central venous catheterization was 41.42%.there was 298 suspected catheter-related bloodstream infection and removal of central venous catheter.

298 patients with suspected catheter-related infection, central venous catheter was removed under aseptic operation, and the catheter tip was cut down by about 5cm with sterile scissors for bacterial culture and drug sensitivity test.The data were tested by statistical software package spss19.0, and P < 0.05 was statistically significant.

Table 1 distribution and composition of pathogenic bacteria in catheter infection (%)

Pathogenic bacteria	A positive number	Composition than
Gram negative bacillus	10	45.45
Pseudomonas aeruginosa	1	4.55
Acinetobacter baumol	4	18.18
Klebsiella pneumoniae	1	4.55
Escherichia coli	4	18.18
Fungus	2	9.09
Candida albicans	1	4.55
Pseudomonas subsmooth	1	4.55
Gram positive coccus	10	45.45
Staphylococcus epidermis	3	13.64
Fecal enterococcus	4	18.18
Excrement enterococcus	3	13.64

Results:

1.Of the 298 patients, 22 were diagnosed with catheter-related bloodstream infection, with an infection rate of 0.20%.Among the confirmed patients, 14 were male and 8 were female, and the duration of catheterization was 7-157 days, 3-35 days of fever, and the maximum duration of continuous fever was 18 days.There were 4 cases of cholangiolithiasis, 3 cases of cholangiocarcinoma, 7 cases of pancreatitis, 3 cases of pancreatic cancer, 2 cases of pancreatic injury and 3 cases of liver cancer.

2.A total of 22 pathogenic bacteria were detected in CRBSI patients with pathogen distribution, among which gram-positive coccus accounted for 45.45%, gram-negative bacillus accounted for 45.45%, and fungi accounted for 9.09%, as shown in table 1.

3 Relationship between CRBSI and catheter retention time: It turns out that x2 is equal to 1.243, P is more than 0.05. The relationship between catheter retention time and infection is uncorrelated, as shown in table 2.

Table 2 Relationship between catheter infection and retention time and the infection rate (%)

retention time(d)	send the samples (n)	positive cases (n)	infection rate (%)
≤7	30	1	3.33
8-14	41	3	7.32
15-21	54	3	5.56
22-30	48	4	8.33
>30	125	11	8.80
合计	298	22	7.38

Discussion and conclusion:

The incidence of CRBSI in this study was 0.20%, of which, gram-positive bacteria accounted for 45.45%, Gram-negative bacteria accounted for 45.45%, Fungi accounted for 9.09 %. Compared with other reports, the infection rate is relatively low, and the reasons may be related to the differences in distribution of pathogenic bacteria caused by patients' basic conditions and different antimicrobial drugs.This study shows that catheter infection rate does not increase with time, catheter infectionmaybe related to many factors.

Prevention is the key. In clinical work, invasive operation should be reduced, long-term application of broad-spectrum antibacterial drugs should be avoided, patients' immunity should be improved, and unnecessary venous catheterization should be removed as soon as possible.At the same time, the nursing care of deep vein catheterization should be strengthened, strict training should be conducted, standardized aseptic operation should be strengthened, and appropriate intervention measures such as selecting suitable puncture site to reduce the occurrence of CRBSI.