

Prevention of tunnelled catheter-related  
bacteraemia: antibiotic, heparin or citrate  
lock solution, associated with universal  
hygiene recommendations?

A three consecutive period follow-up  
(1999 – 2006)

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# INTRODUCTION

- Ø Infectious complications of the vascular access are a major source of morbidity and mortality among hemodialysis patients (HD).
- Ø Numerous reports implicate the vascular access in up to 48 to 73% of all bacteremias in HD patients.
- Ø Infectious represent 50 to 70% of causes of catheters withdraw.
- Ø The mean incidence of bacteraemia ranges from 2 to 3 per 1000 catheters-days with hemodialysis catheters.
- Ø The use of lock antibiotic in hemodialysis was proved to prevent bacteria infection of permanent catheters.

## THE AIM OF STUDY

The aim of this study (1999-2006) was to evaluate the incidence of catheter-related bacteraemia during three consecutive periods.



# MATERIEL AND METHODS

- All patients with permanent silicone catheters ( non-cuffed) were included for this prospective study (1999 - 2006).
- The three strategies of locking catheter was evaluated with a comparison of the incidence of catheter-related bacteraemia:

Gentamicin-lock solution was used during the period 1 (from March 1999 to June 2000; n= 4954 catheter-days)

heparin-lock during the second period (July 2000 to December 2004; n= 12405 catheter-days)

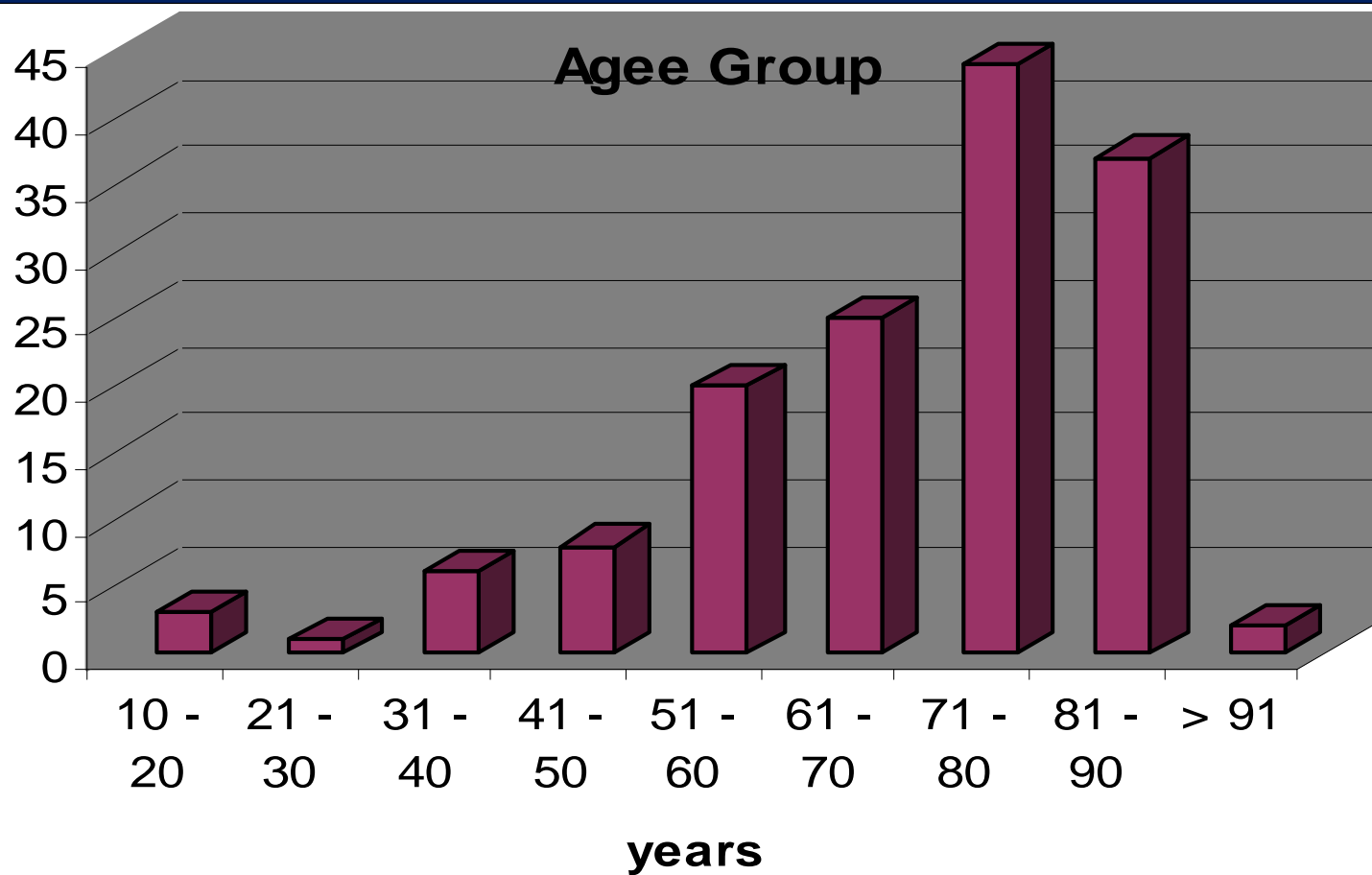
citrate lock (citrate 46.7%) during the third period (January 2005 to December 2006 n= 7001 catheter-days). Universal hygiene recommendations were strictly applied during the three periods.

# Characteristics of the population

146 patients, and 168 tunneled catheters were included during the study

Ages (years)	69.6 ± 16
Diabetic patients	37.5%
Sex ( men)%	58%

# Characteristics of the population

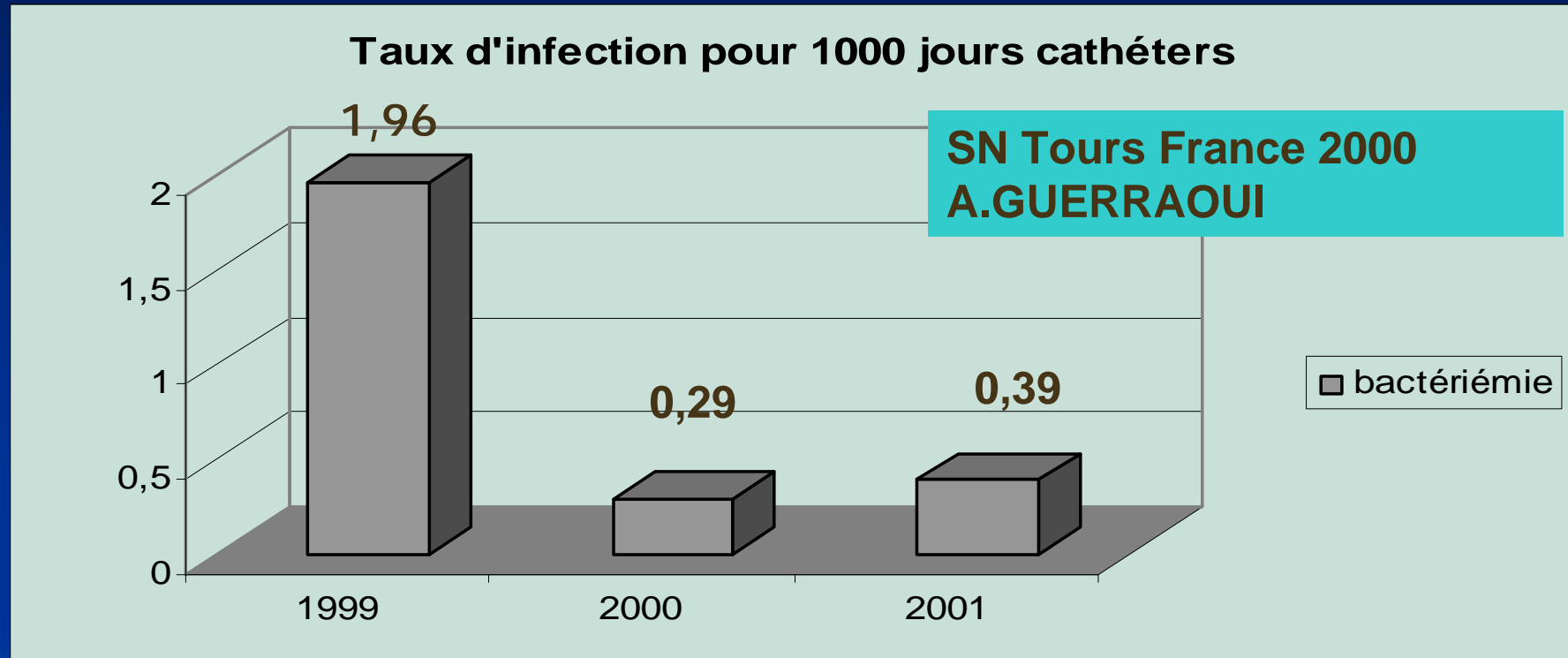


# RESULTS



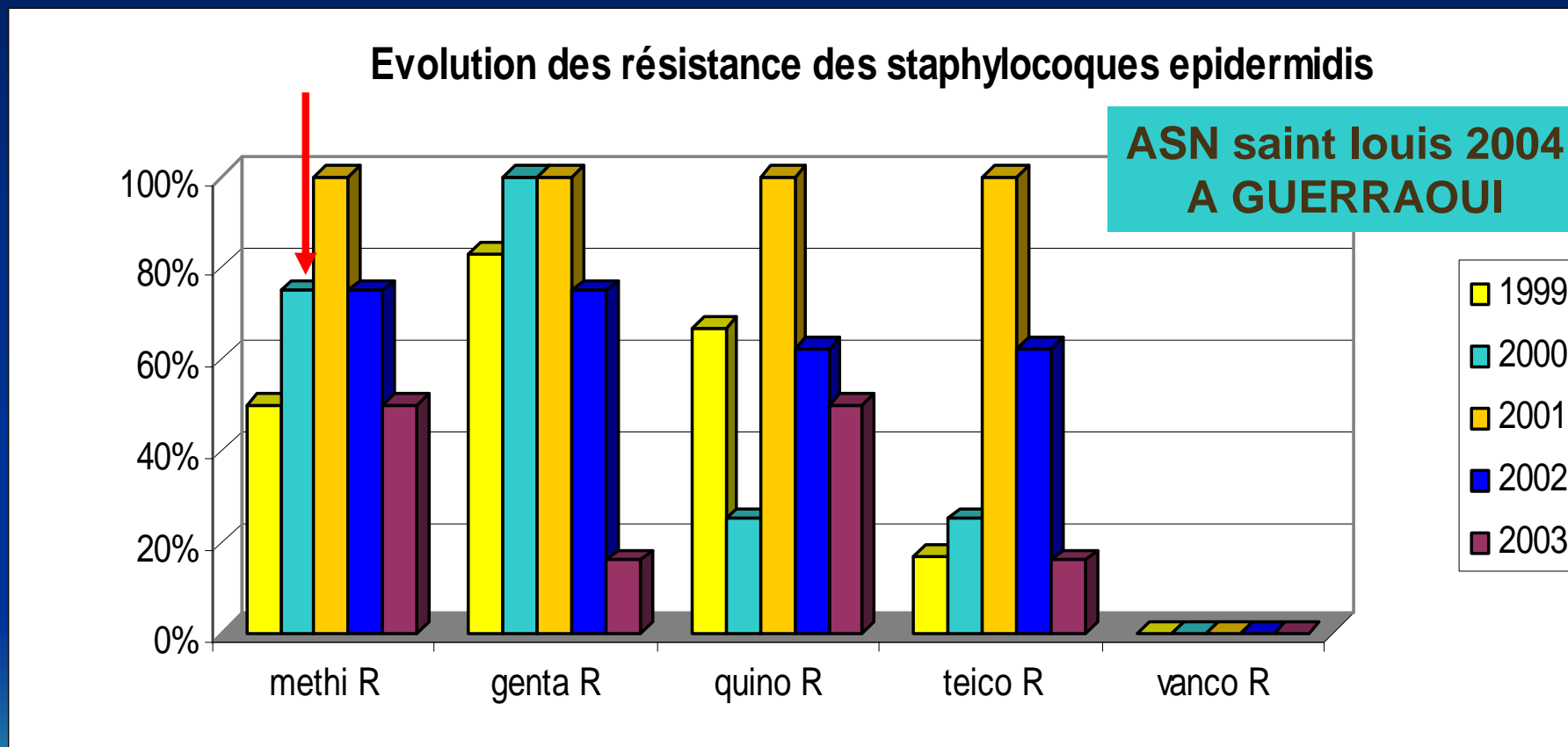
# Period 1

## 4954 catheters – days



- During the period 1 the catheter-related bacteraemia observed was: 1.96 per 1000 catheters-days in 1999, and 0.29 in 2000. Emergence of multiresistant staphylococcus epidermidis (MRSE) was observed and gentamicin lock was abandoned.

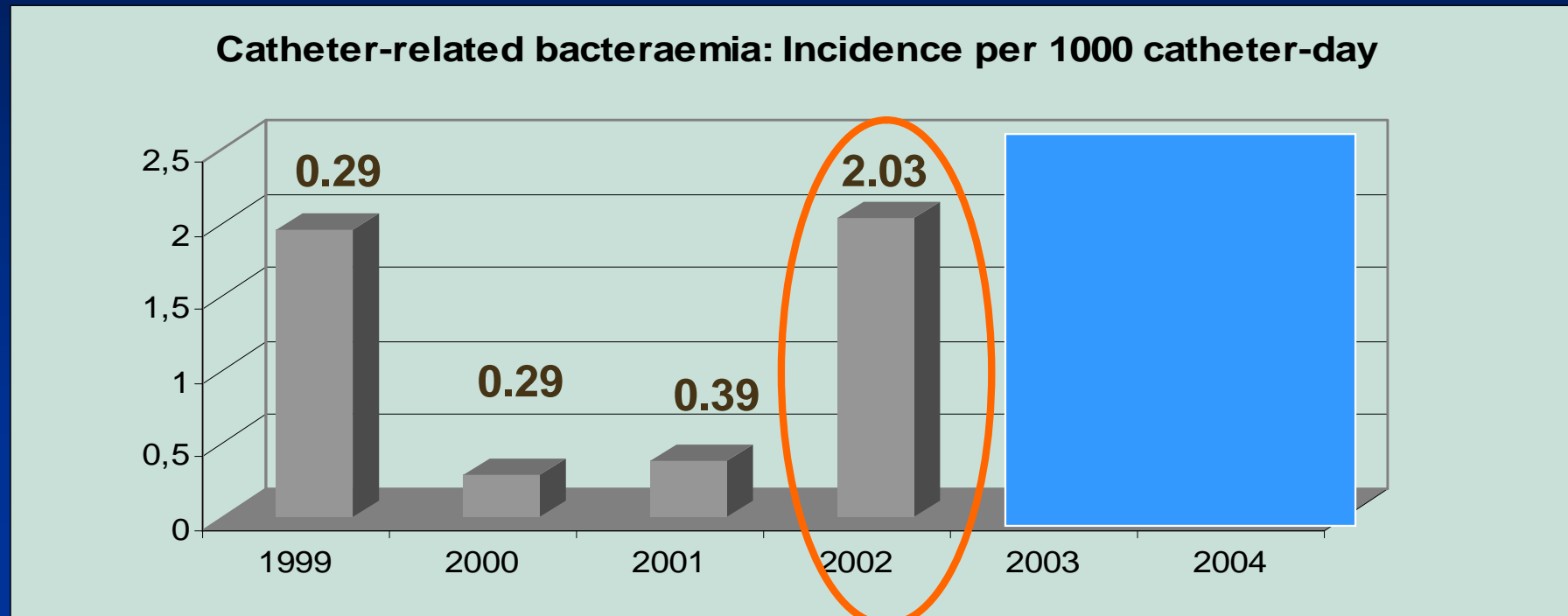
# Emergence of Multiresistant Staphylococcus Epidermidis (MRSE) after Lock Antibiotic Regimen by Gentamicin in Permanent Hemodialysis Catheters. Prospective Study 1999 -2003.



- The MRSE rate decreased within the next 18 months, and return back to the initial bacteriological situation 30 months later

# Period 2

## 12405 catheters – days

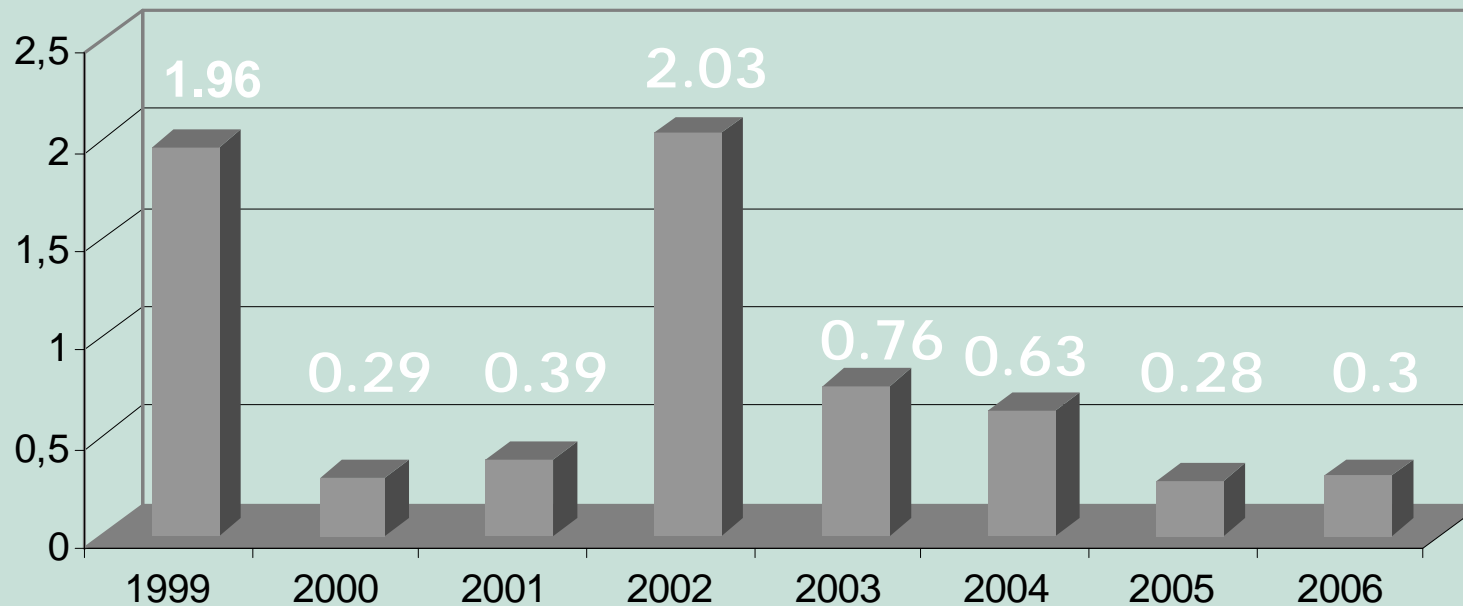


- During the period 2 the incidence of catheter-related bacteraemia increased from 0.39 in 2001 to 2.03 per 1000 catheter-days in 2002. In 2003 an audit of hygiene practices revealed breakages in the universal hygiene recommendations by the youngest nurses. After intensive nurses formation the incidence of bacteraemia in decreased to 0.76 and 0.63 per 1000 catheter-days in 2003 and 2004 respectively.

# Perio 3

## 7001 catheters- days

Catheter-related bacteraemia: Incidence per 1000 catheter-day



- During the period 3 the incidence of bacteraemia decreased to 0.28 and 0.37 per 1000 catheter-days in 2005 and 2006 respectively. No adverse events and no catheter thrombosis were observed.
- The citrate lock with universal hygiene recommendations have the same incidence then lock antibiotic.

# conclusion

- Our data constitutes one of the largest prospective registries (1999 – 2006) to evaluate tunneled catheters related bacteraemia.
- Our data confirmed the emergence of resistance after use of lock antibiotic.
- We recommend to discontinue lock antibiotic.



- All study compared lock antibiotic in catheters-related infection was short study (3 to 12 months) and they not examined the emergence off resistance.



# DISCUSSION

- A most of catheters were colonised and a biofilm formation were rapidly formed. The biofilm ultrastructure protect microbial for antibiotic and induced ANTIBIOTIC RESISTANCE. The used lock antibiotic increased emergence of MRSE. We propose Universal hygiene and Erradication of microbial biofilm by lock solution like taurolidine or citrate to prevent catheters infection and biofilm formation.



	1999	2000	2001	2002	2003	2004	2005	2006
Orifice infection	5,22	3,76	5,07	5,28	3,78	6,95	3,86	2,08
Microbial catheters colonised	11,1	3,47	2,34	5,28	1,51	1,26	1,93	2,08
Bacteriemia	1,96	0,29	0,39	2,03	0,76	0,63	0,28	0,30

INCIDENCE PER 1000 CATHETERS-DAYS