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Background and Goal of Study

- Nasotracheal intubation potentially involves in contamination of microbes in the upper respiratory tract into the lower respiratory tract. However the disinfection method has not been determined.
- We investigated the sterilizing effects of **benzalkonium chloride (BZK)** and **povidone iodine (PVI)** on nasotracheal intubation.

Materials and Methods ① (for patients)

- The study was pre-registered on UMIN-CTR (UMIN000029645) after being approved by the Institutional Review Board of the School of Dentistry, Aichi Gakuin University.
- Written consent was received from all the patients. The subjects were 46 patients who were 20 to 70 years of age, classified as 1 to 2 in ASA-PS. They were randomly divided into Group BZK (n=23) and Group PVI (n=23).
- The subjects' nasal cavities **before sterilization (A)** and **after sterilization (B)**, and the internal surface of the intubation tube **after extubation (C)** were swabbed.
- The swabs were subjected to culturing in a selective medium for staphylococci.



- The number of bacteria per cotton swab (CFU) and **the rates of change in bacterial count (B/A, C/B)** were calculated.

Materials and Methods ② (in vitro)

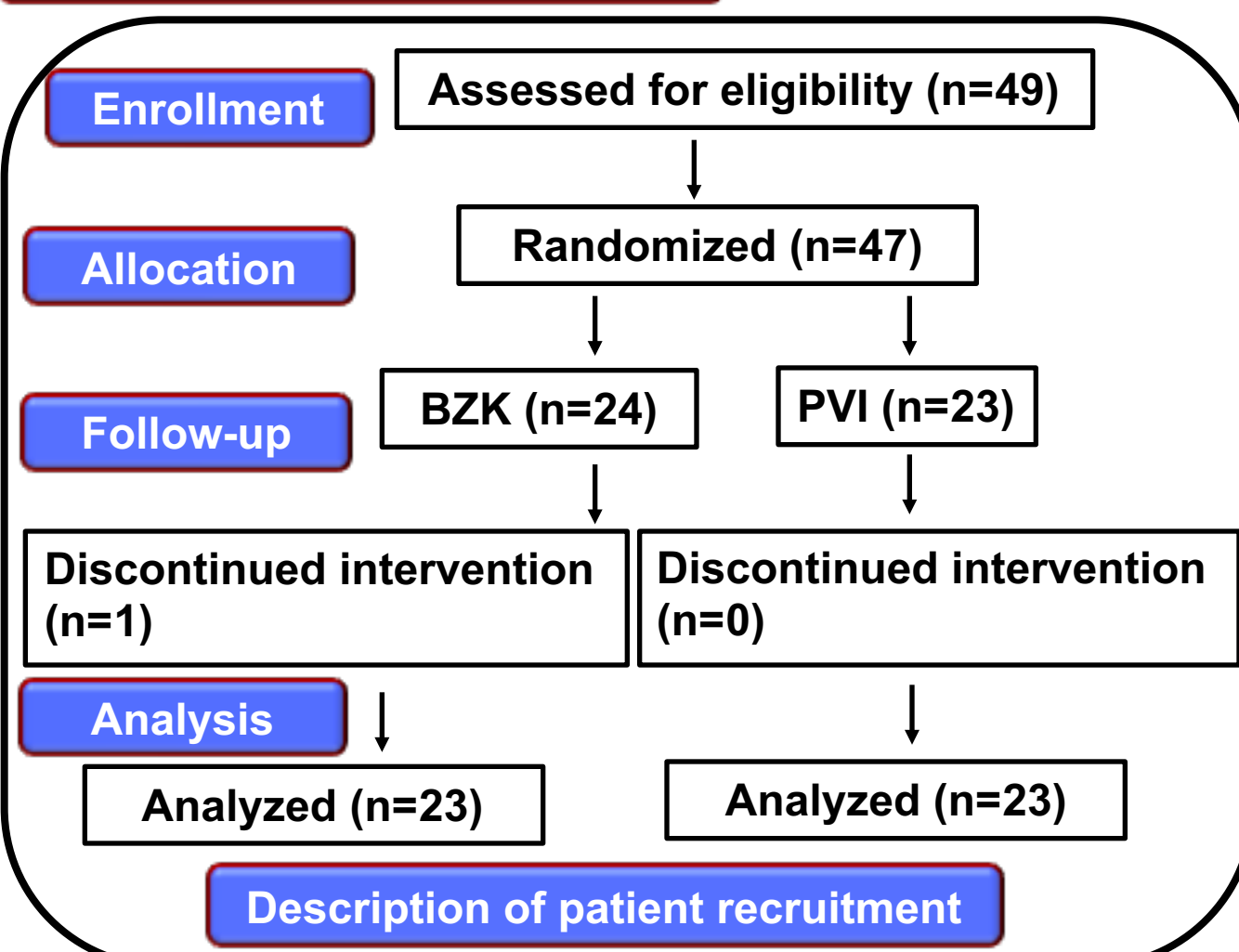
Major outcome

- The growth inhibitory effect on *Staphylococcus aureus* was also examined.

Statistical testing

The χ^2 test of independence and the Mann-Whitney U test were used, and a difference with $P < 0.05$ was considered as statistically significant.

Results ①



The number of bacteria and the rate change in bacterial count

	Group BZK	Group PVI	P Value
A (CFU)	10000 (1700-40000)	7000 (1500-30000)	0.8 NS
B (CFU)	200 (20-2000)	20 (20-20)	$P < 0.01$
C (CFU)	20 (20-70)	20 (20-110)	0.94 NS
B/A (%)	4.3 (1.4-9.7)	0.3 (0.1-2.1)	$P < 0.01$
C/B (%)	29 (7-100)	100 (100-550)	$P < 0.01$
	Median (Quartile)	NS: Not significant	

Results ②

Growth inhibition effect on *Staphylococcus aureus*

BZK

PVI

Staphylococcus aureus Inhibited diluted 2⁹ times Inhibited diluted 2⁶ times

Discussion

- BZK is used at a concentration higher than PVI on inhibitory effect on the bacterial growth. BZK maintained the threshold concentration showing antimicrobial effect longer than PVI, which seemed to show better sustaining effect.
- It is unclear as to why the initial sterilizing effects in Group BZK were somewhat inferior to those observed in Group PVI, and alterations to sterilization methods or the time allowed for effects might be necessary.

Conclusion

BZK can be used to create a hygienic nasotracheal intubation environment with sustained sterilizing effects.