



Nontyphoidal salmonella infection in children and adolescent; A retrospective, multicenter study in Korea



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Background

- ✓ Non-typhoidal *salmonella* (NTS) infections usually have a self-limiting course, but can cause invasive NTS (iNTS) diseases, including bacteremia, meningitis, osteomyelitis or other focal infection.
- ✓ Studies dealing with NTS infections in children and adolescent are scarce in Asian countries, including South Korea.

Objectives

- ✓ We aim to investigate the differences in clinical features and antimicrobial susceptibility patterns according to the presence or absence of bacteremia in NTS infection in Korean children.

Methods

- ✓ Subjects: Children and adolescent (<20 years of age) who had NTS was detected in cultures of blood and/or other sterile body fluid except genitourinary tract at Sinchon, Gangnam, and Yong-in Severance Hospital located in Seoul, Korea between November 2006 and May 2021.
- **Bacteremia group:** patients who had NTS was detected in blood culture
- **Non-bacteremia group:** patients who had NTS was detected in cultures in any sites except blood, genitourinary tract
- **Invasive NTS (iNTS) group:** patients who diagnosed with NTS bacteremia and/or extraintestinal focal infections including osteomyelitis, abscess
- **Non-invasive NTS group:** patients excluding iNTS group patients
- ✓ We collected medical data from chart review.
- ✓ Definition of poor clinical responsiveness (at least one of followings):
 - (1) If clinical symptoms (i.e. fever, pain) worsen
 - (2) If the serial CRP level worsen during hospitalization
 - (3) If the culture test is consistently positive despite taking antibiotics for at least 3 days

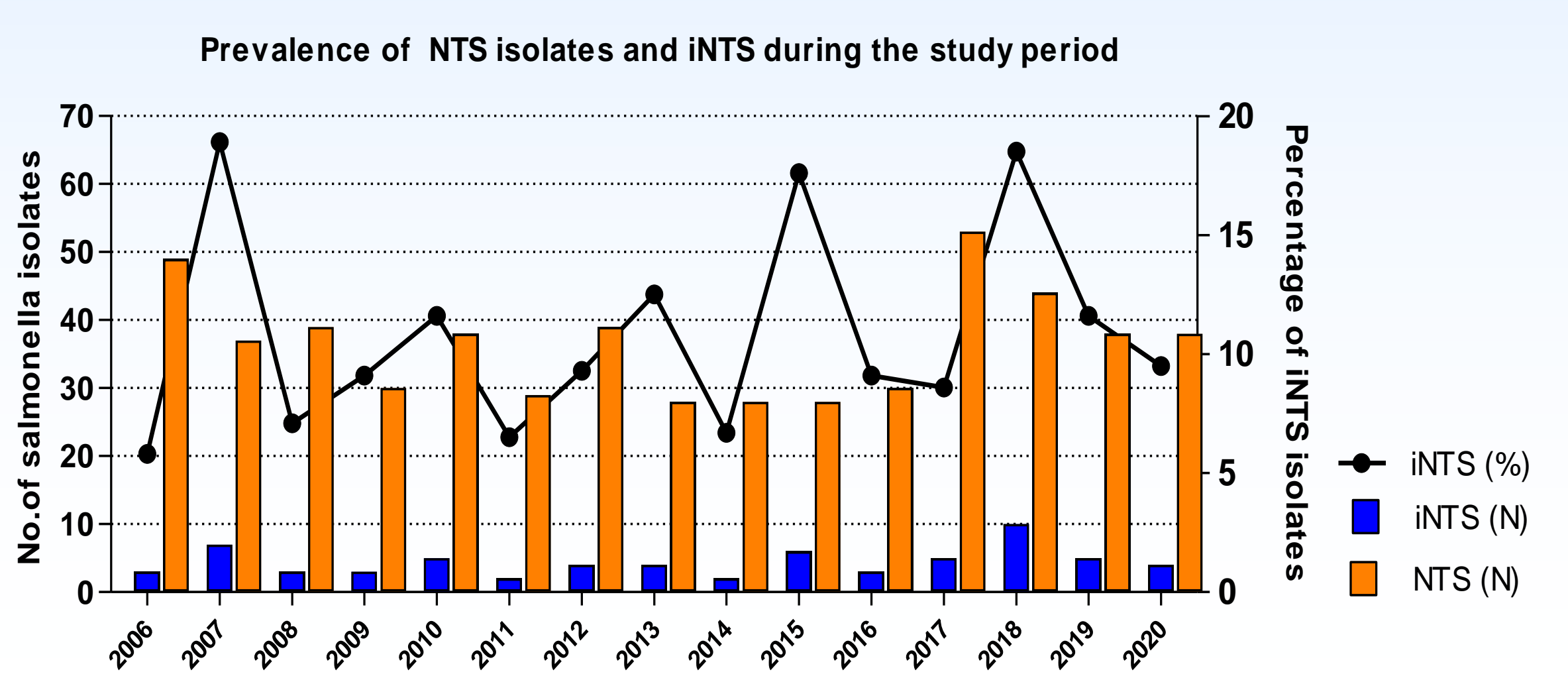
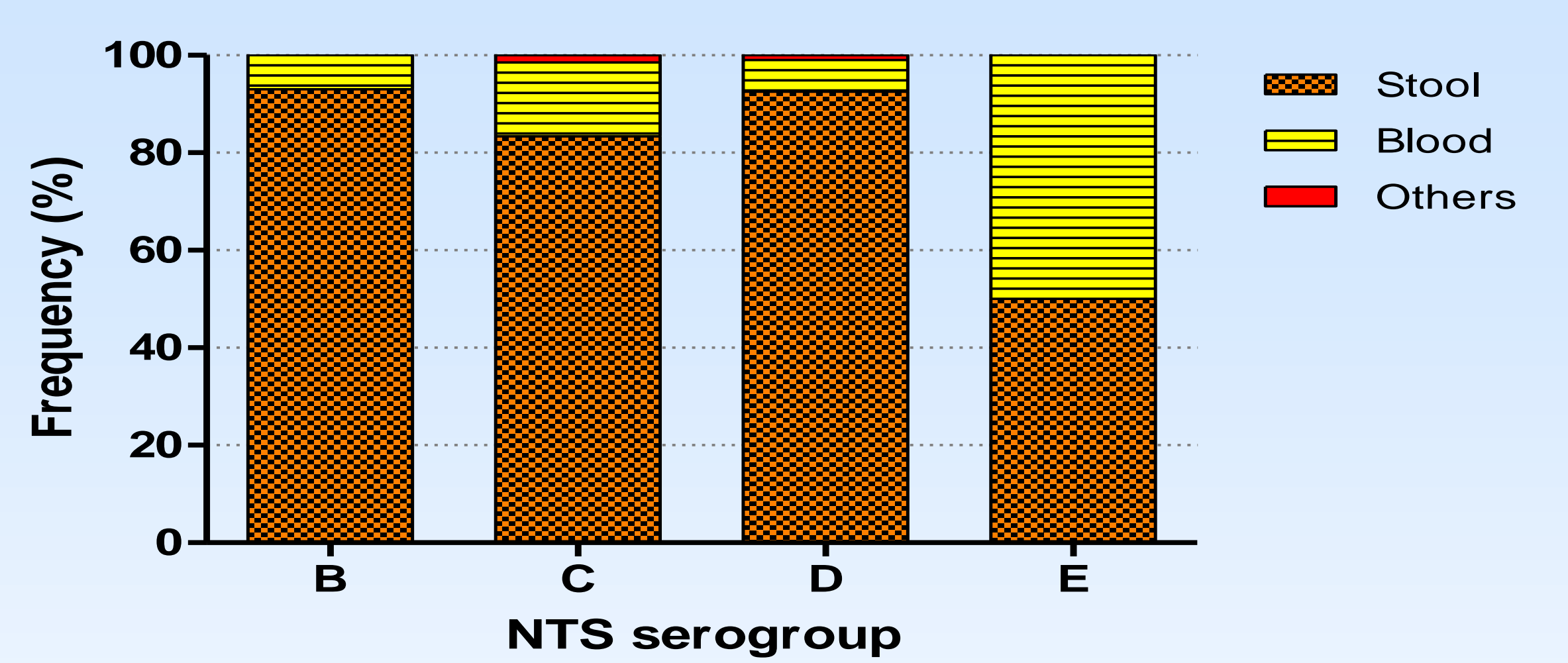
Results

Baseline characteristics & clinical manifestation between NTS bacteremia and non-bacteremia group

	Bacteremia (N = 61)	Non-bacteremia (N = 554)	P-value
Sex, male, N (%)	40 (65.6)	337 (60.8)	0.4703
Age, median (IQR)	3.9 (1.73-9.6)	4.6 (2.4-7.9)	0.8979
Underlying disease, N (%)	10 (16.4)	87 (15.7)	0.8885
Hematologic	4 (6.6)	10 (1.8)	0.0411
Gastrointestinal	0	12 (2.2)	0.6197
Neurologic	1 (1.6)	20 (3.6)	0.7113
Cardiovascular	0	8 (1.4)	>.9999
Respiratory	2 (3.3)	10 (1.8)	0.3376
Diagnosis, N (%)			
Colitis	41 (67.2)	502 (90.6)	<0.0001
Osteomyelitis	2 (3.3)	5 (0.9)	0.1469
Abscess	1 (1.6)	2 (0.4)	0.2694
Fever, N (%)	54 (88.5)	472 (85.5)	0.5216
Fever duration (Mean±SD)	7.6±5.3	5.0±4.5	0.0021
Diarrhea, N (%)	46 (75.4)	492 (89.1)	0.0019
Diarrhea duration (Mean±SD)	10.2±5.7	6.6±3.6	0.0041
Extra-GI symptoms, N (%)	14 (22.9)	85 (15.4)	0.1282
Laboratory finding (Mean±SD)			
WBC count (/uL)	10199.5±4038.6	10320.8±5440.9	0.8566
Hb (g/dL)	12.1±1.4	12.3±1.3	0.4068
CRP (mg/L)	52.7±50.7	63.6±62.8	0.1294
ALT (IU/L)	28.2±24	21.7±24.4	0.0468
Hospitalization, N (%)	39 (63.9)	431 (77.8)	0.0155
Duration of Hospitalization (Mean±SD)	8.4±6.3	5.2±3.4	0.0038

Characteristics of isolated NTS species

- ✓ Culture type in which NTS have been identified
 - **Stool culture:** 550 of 615 subjects (89.4%)
 - **Blood culture:** 61 of 615 subjects (9.9%) (Blood only(39) Blood and stool (21) Blood and abscess(1))
 - **Abscess culture:** 5 of 615 subjects (0.7%) (Buttock(2) Neck(1) Pelvis cavity(1) iliac muscle(1))

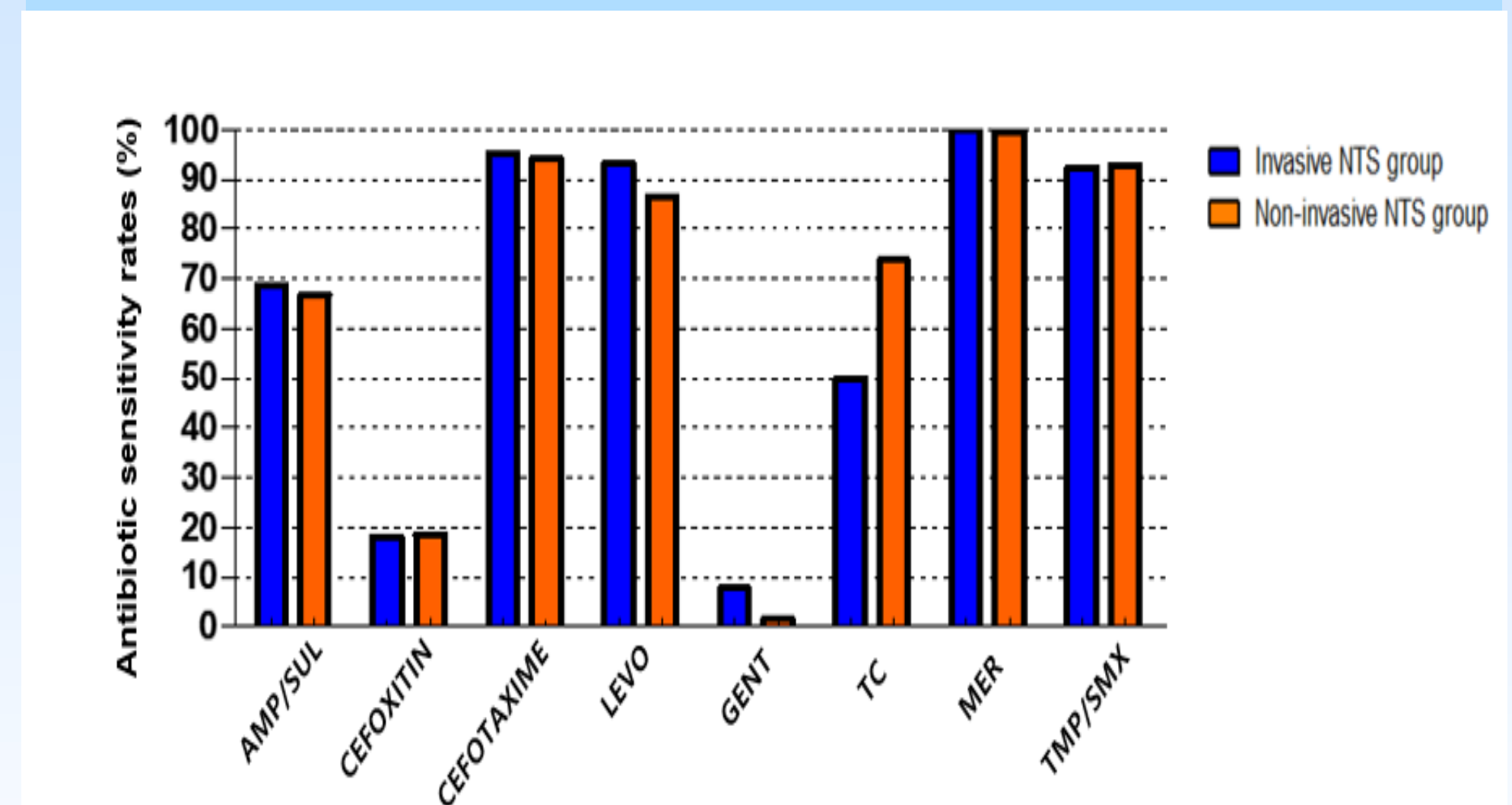


Comparison between good response and poor response to cefotaxime treatment group

	Poor response group (N = 58)	Good response group (N = 272)	P-value
Bacteremia, N (%)	10 (17.2)	26 (9.6)	0.0884
Diagnosis, N (%)			
Colitis	48 (82.8)	250 (91.9)	0.0325
Abscess	1 (1.7)	2 (0.7)	0.4411
Osteomyelitis	6 (10.3)	1 (0.4)	0.0001
Unrelated	1 (1.7)	15 (5.5)	0.3228
Comorbidity, N (%)	7 (12.1)	47 (17.3)	0.3301
Fever, N (%)	52 (89.7)	244 (89.7)	
Duration of fever, mean±SD	6.8±5.3	4.7±2.4	0.0064
Diarrhea, N (%)	48 (82.8)	248 (91.2)	
Duration of diarrhea, median (IQR)	8.5±5.9	8.2±25.7	0.8848
Extra-GI symptoms, N (%)	16 (57.6)	38 (13.9)	

Results

Antimicrobial susceptibility results between invasive NTS and non-invasive NTS group



Summary of Results

- ✓ The NTS bacteremia group did not have any significant differences in age of onset, presence of fever, white blood cells, absolute neutrophils, and C-reactive protein levels, but the frequency diarrhea (75.4% vs. 89.1%, $p=0.0019$) was less compared to the non-invasive NTS group.
- ✓ The length of hospital stay (8.4 ± 6.3 days vs. 5.2 ± 3.4 days, $p=0.0038$) were significantly longer in the bacteremia group than in the non-bacteremia group.
- ✓ Despite high susceptibility to the 3rd cephalosporin, 17.6% (58/330) had clinically poor response to the 3rd cephalosporin.

Conclusion

- ✓ Children with NTS bacteremia showed a relatively severe clinical course compared to children without bacteremia.
- ✓ NTS bacteremia can be considered to accounted for a significant proportion of Korean NTS patients.
- ✓ Further studies on the epidemiology and characteristics of invasive NTS infection are needed.