

Introduction

- Anaerobic or mixed anaerobic infections account for a small, but significant portion of hospital acquired infections. Pathogenic anaerobes are often found in wounds or the intra-abdominal cavity, may manifest as abscesses, pneumonia, and are often associated with surgery or trauma.
- Understanding the nature of anaerobic infections at our institution may aid our Antibiotic Stewardship Program (ASP) in optimizing empiric antibiotic therapy for our patients.

Objectives

The purpose of this study is to evaluate the characteristics and microbiology of anaerobic infections at our community teaching hospital.

Methods

- Through a report generated from the TheraDoc software, subjects who cultured positive for anaerobic bacteria between November 2023 to August 2024 were identified. A total of 135 patients treated with antibiotics for their anaerobic infection were included in this analysis.
- Patients considered to be colonized without an active anaerobic infection or did not receive anaerobic antibiotic therapy were excluded in this analysis.
- Data collection included patient demographics, cultures and sensitivities, infection source and type, and antimicrobial utilization.
- Observational statistics were employed for pathogen type, culture source and infection type. Approval by the IRB at AtlantiCare Regional Medical Center was obtained.

Results

Table 1. Patient and Culture Findings (n=135)

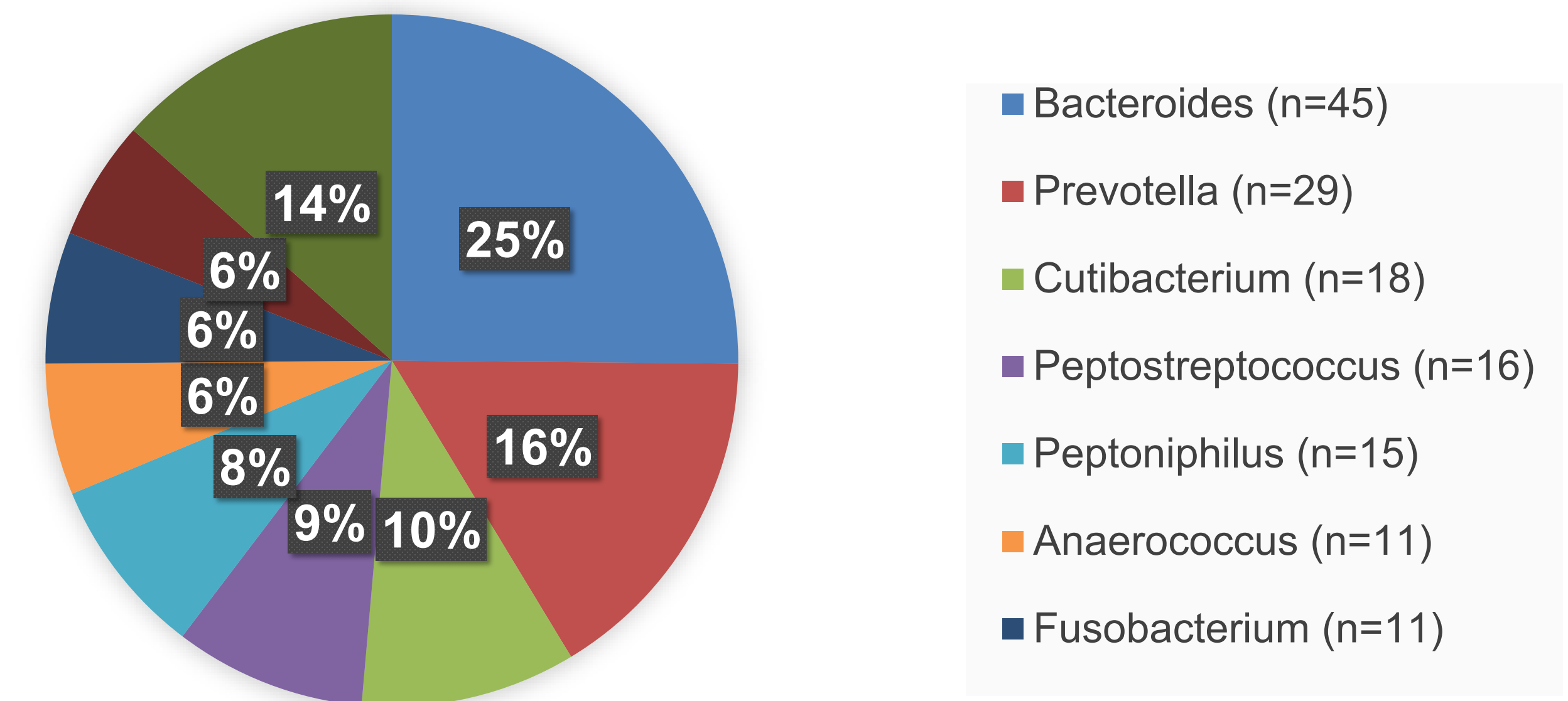
Average age in years – no. ± SD	58.3 ± 17.3
Male – no. (%)	88 (65.0%)
Community acquired infections – no. (%)	103 (76.0%)
Total anaerobic cultures – no.	140
Patients with Polymicrobial cultures – no. (%)	100 (74.0%)
Mixed anaerobic / aerobic – no. (%)	93 of 100 (93.0%)
Types of anaerobic genera identified – no.	18
Gram positive anaerobes – no. (rods / cocci)	11 (5 / 6)
Gram negative anaerobes – no. (rods / cocci)	7 (7 / 0)

Results

Table 2. Culture Source and Microbe Species

Culture Source	Microbe Species (Gram negative; Gram positive)
Blood 59 cultures (42.0%) Total anaerobes – 68	Bacteroides - 18 (B. fragilis - 10) Cutibacterium - 11 (C. acnes - 10) Peptostreptococcus (7), Anaerococcus (7), Peptoniphilus (6), Staphylococcus saccharolyticus (5), Prevotella (4), Clostridium (4), Parvimonas (3), Fusobacterium (2), Parabacteroides (1)
Abscesses 30 cultures (21.0%) Total anaerobes – 44	Prevotella - 9 (P. bivia - 3, P. denticola - 3) Bacteroides - 8 (B. fragilis - 2, B. thetaiotamicron - 2) Fusobacterium - 6 (F. nucleatum - 6) Peptoniphilus (3), Peptostreptococcus (3), Clostridium (3), Cutibacterium (2), Porphyromonas (2), Eikenella (2), Anaerococcus (2), Parabacteroides (2), Campylobacter (1), Actinomyces (1)
Tissue / Wound 22 cultures (16.0%) Total anaerobes – 25	Prevotella - 7 (P. oralis - 3) Peptostreptococcus - 3 (P. magna - 2) Bacteroides - 3 (B. fragilis - 3) Mycobacteroides (2), Fusobacterium (2), Cutibacterium (2), Peptoniphilus (2), Parabacteroides (1), Eikenella (1), Anaerococcus (1), Clostridium (1)
Bone / Joint 14 cultures (10.0%) Total anaerobes – 15	Bacteroides - 5 (B. fragilis - 3) Prevotella - 4 (P. bivia - 3) Peptostreptococcus (3), Cutibacterium (2), Anaerococcus (1)
Abdomen 13 cultures (9.0%) Total anaerobes – 22	Bacteroides - 11 (B. thetaiotaomicron - 6 / B. fragilis - 4) Prevotella - 4 (P. bivia, P. denticola, P. oralis, P. disiens) Peptoniphilus (2), Clostridium (2), Cutibacterium (1), Fusobacterium (1), Eikenella (1)
Lung 2 cultures (2.0%) Total anaerobes – 3	Parvimonas micra - 1 Peptoniphilus asaccharolyticus - 1 Bifidobacterium -1

Figure 1. Anaerobic Species Identified



Discussion

- The most prevalent anaerobes identified were *Bacteroides* (25%) and *Prevotella* (16%), both gram-negative rods, underlining their significance in the spectrum of anaerobic infections. Most anaerobic infections (93%) were mixed with aerobes, commonly community acquired (76%), and often with *Staphylococcus* (including coagulase negative staph, MRSA), *Streptococcus*, and *E. coli*. Out of 18 different anaerobes identified, 13 (72%) were classified as obligate anaerobes.
- Bacteremia comprised 42% of the anaerobic infections, frequently caused by *Bacteroides* and *Cutibacterium*. Interestingly, *Cutibacterium* were identified in 11 blood cultures as well as 4 other sources. Further investigation into the *Cutibacterium* bacteremias may be warranted.

Conclusion

Our findings highlight the polymicrobial nature of most anaerobic infections emphasizing the need for broad-spectrum antibiotics in select patients, particularly from the community. Our ASP will reassess empiric antibiotic treatment recommendations for different indications based on these findings.