Part 2: C. acnes Sensitivity to Antibiotic Formulations a/b: BPO

- C. acnes susceptibility to antibiotics alone or in a fixed-dose combination with BPO was determined by measuring zone of inhibition using agar-diffusion method with larger diameter indicating increased bacterial inhibition (Figure 2, left).

- All antimicrobial formulations produced similar ranges of zones of inhibition, indicating similar activity against the C. acnes strains.

- Six C. acnes strains had no inhibitory zone (0 cm), all with clindamycin alone, fixed-dose combinations of BPO with clindamycin had enhanced activity against the same 6 isolates compared to clindamycin alone (Figure 2, right).

Figure 2. C. acnes Sensitivity to Clindamycin Compared to Clindamycin+BPO

CONCLUSIONS

- Tested antimicrobial compounds possessed similar activity against most C. acnes strains, with formulations containing BPO having enhanced activity against strains less susceptible to clindamycin.

- Combination of clindamycin and BPO resulted in an additive effect for over half of acne-associated strains tested.

- Overall, adding BPO to an antibiotic can improve antimicrobial activity against C. acnes, and may protect against the development of resistance.

REFERENCES


AUTHOR DISCLOSURES

Mahmoud Ghannoum has served as a consultant or received research funds from AbbVie, Amgen, Merck, Pfizer, Sun Pharma, and UCB. Leonard Schachner has served as a consultant for Ortho Dermatologics. Julie Harper has received honoraria for Ortho Dermatologics. James Q. Del Rosso has served as a consultant for AbbVie, Amgen, and Pfizer. Linda Stein Gold, MD, has received research funds from AbbVie, Amgen, and Pfizer. Leon H. Kirke, MD, has served as a consultant for AbbVie, Amgen, and Pfizer. Julie C. Harper, MD, has served as a consultant for AbbVie, Amgen, and Pfizer.}

METHODS

- Part 1: C. acnes Sensitivity to Antibiotics
  - C. acnes susceptibility to antibiotics was assessed via minimum inhibitory concentration (MIC) values obtained from spectrophotometer readings.
  - MIC is the lowest concentration of an antibiotic needed to inhibit bacterial growth.
  - Lower MIC indicates higher antibiotic susceptibility.

- All antibiotics tested (clindamycin, clindamycin, bacitracin, and moxifloxacin) had similar MIC ranges, indicating similar activity against most C. acnes strains tested.

- MICs for clindamycin and BPO were determined using a Microdilution method.

- Six C. acnes strains had no inhibitory zone (0 cm), all with clindamycin alone.

- Formulations containing BPO had enhanced activity against the same 6 isolates compared to clindamycin alone (Figure 2, right).

FIGURE 2. C. acnes Sensitivity to Clindamycin Compared to Clindamycin+BPO

Formulations with BPO enhanced activity against 6 C. acnes strains that had no inhibitory zone with clindamycin alone.

- Part 4: Preventing Antibiotic Resistance With BPO
  - Development of resistance was assessed using serial passage of bacterial cultures in increasing concentrations of clindamycin and BPO in combination with clindamycin (Figure 4, left).

- Bacterial cultures repeatedly exposed to clindamycin and BPO did not develop resistance to C. acnes, which occurred with exposure to clindamycin alone (Figure 4, right).

FIGURE 4. Development of Antibiotic Resistance to Clindamycin Compared With Clindamycin+BPO

- Clindamycin + BPO had similar MIC ranges, indicating similar activity against most C. acnes strains tested.

- Potential of resistance with repeated antibiotic exposure

- Combination of BPO with clindamycin prevented the development of resistance.

- No MIC change remained resistant when adding BPO

- Elevated MIC of clindamycin alone

- Combination of BPO with clindamycin prevented the development of resistance.