

How Does BMI Affect Pressure Ulcer Complications After Surgical Closure?

Stuti P. Garg, BA¹, Kirtana Sandepudi, BS, MS¹, Krish V. Shah¹, Geneviève L. Putnam, BS, MS¹, Namrata V. Chintalapati, BA¹, Joshua P. Weissman, BBA¹, Robert D. Galiano, MD, FACS¹

¹Northwestern University Feinberg School of Medicine Division of Plastic & Reconstructive Surgery

Background

- **Pressure Ulcers (PU):** injuries to the skin and underlying tissue localized over a bony prominence
- Major surgical complications:
 - Ulcer recurrence
 - Wound dehiscence
 - Hematomas
 - Infection
- Complications pose significant morbidity to patients and may be exacerbated by elevated BMI

Objective

To characterize the relationship between preoperative BMI, osteomyelitis, and wound cultures and PU wound outcomes and complications

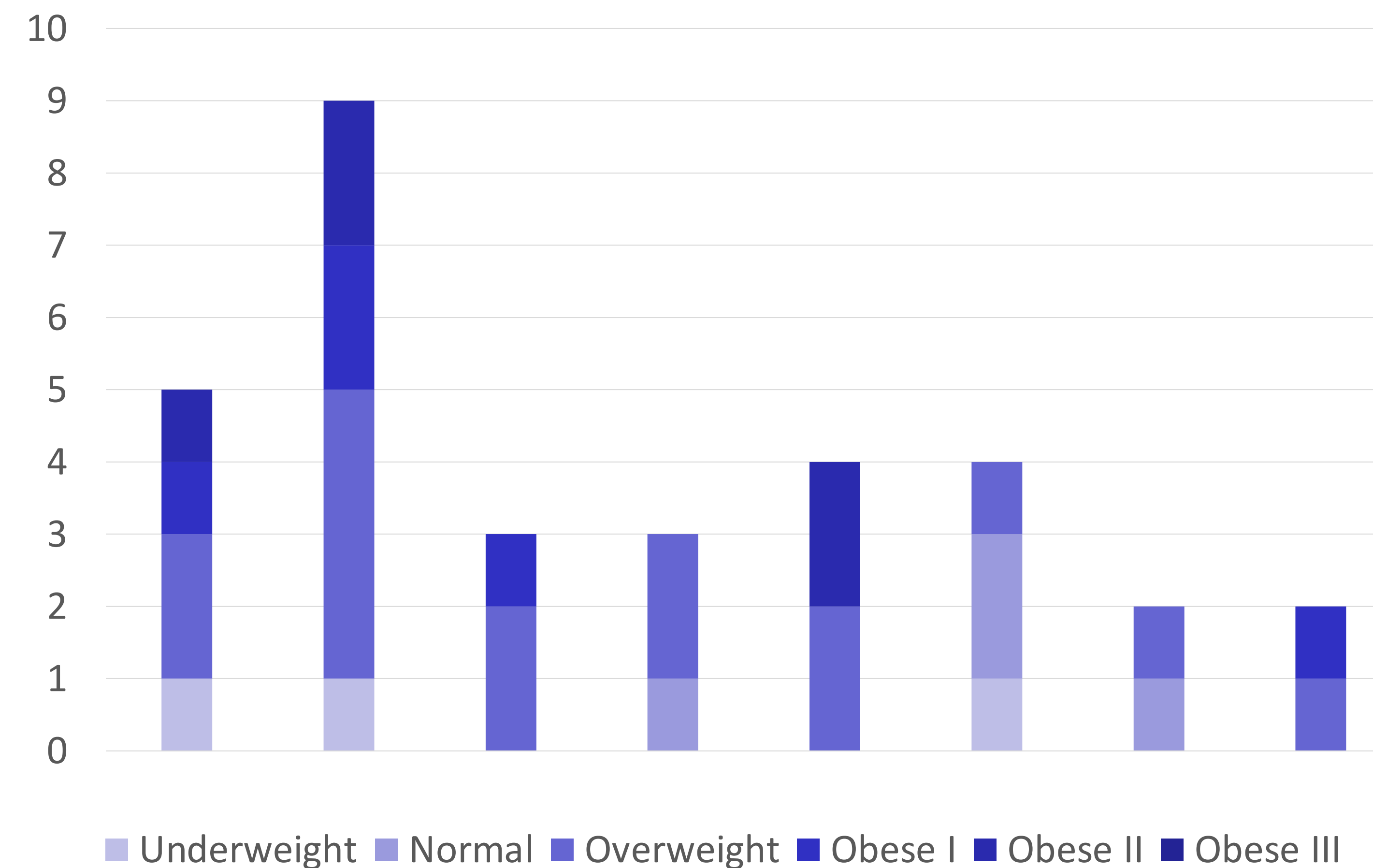
Methods

- Study design: Post-hoc analysis of prospective RCT data
- Patient population: 80 patients with stage III/IV pressure ulcer admitted for surgical closure at Northwestern Memorial Hospital
- Post-op course: patients remained admitted for at least 14 days post-closure for assessment of wound status and complications

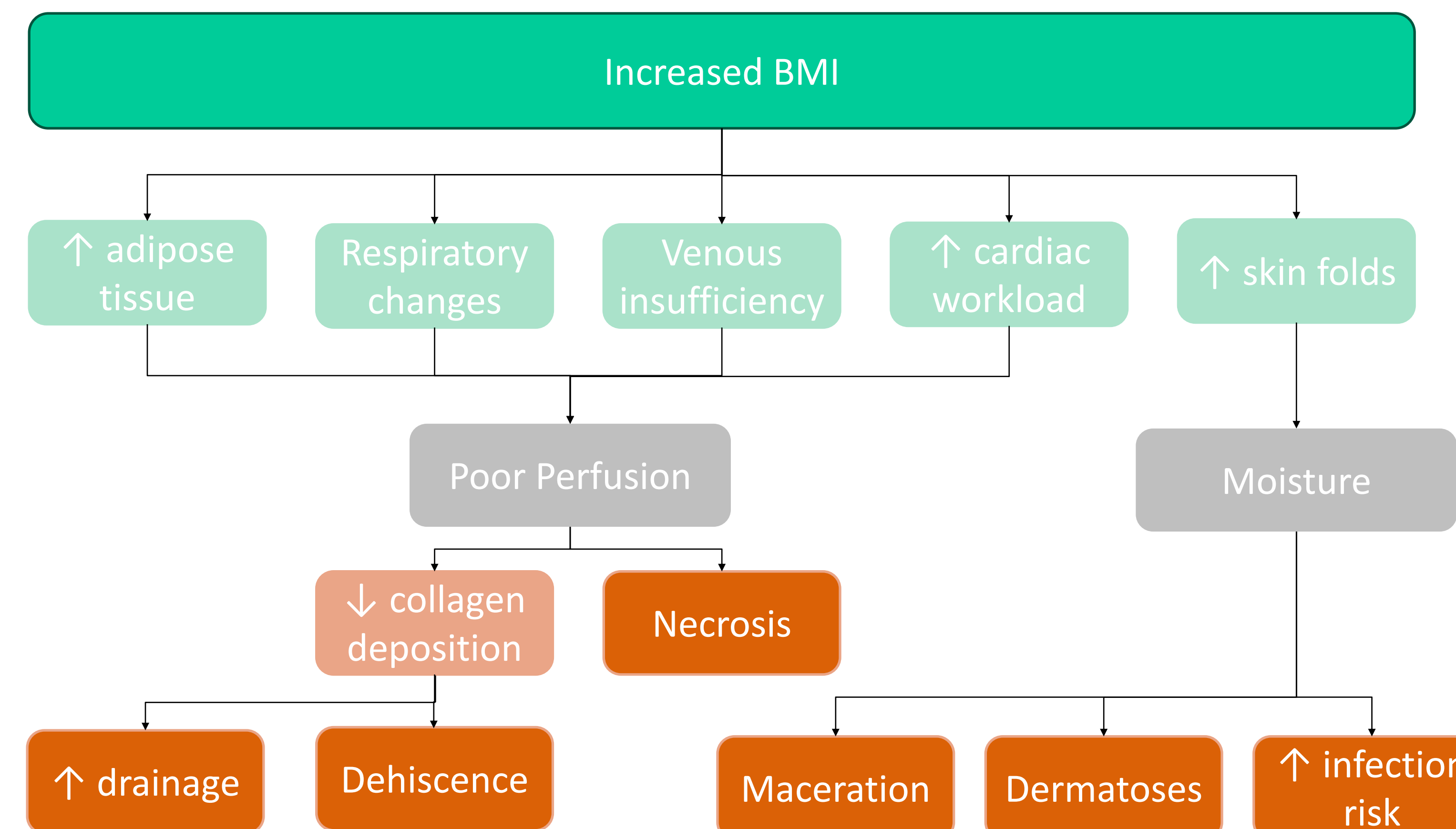
Table 2: Postoperative Wound Status

| | Total No. Pts at POD 14 (%) | POD 14 Open (%) | 1 mo Open (%) | 6 mo Open (%) | 1 yr Open (%) | Total No. Pts at 1 yr (%) |
|-----------------------------|-----------------------------|-----------------|----------------|----------------|----------------|---------------------------|
| BMI | | | | | | |
| Underweight | 9 (11) | 0 (0) | 1 (11) | 0 (0) | 2 (22) | 9 (14) |
| Normal | 20 (34) | 1 (5) | 4 (20) | 6 (30) | 8 (40) | 20 (31) |
| Overweight | 24 (34) | 4 (17) | 9 (38) | 4 (17) | 3 (13) | 24 (38) |
| Obese I | 11 (16) | 3 (27) | 5 (45) | 2 (22) | 3 (43) | 7 (11) |
| Obese II | 2 (3) | 1 (50) | 1 (50) | 1 (50) | 1 (50) | 2 (3) |
| Obese III | 2 (3) | 0 (0) | 0 (0) | 0 (0) | 1 (50) | 2 (3) |
| Total | 68 | 9 (13) | 20 (29) | 13 (20) | 18 (28) | 64 |
| Osteomyelitis Status | | | | | | |
| Acute | 12 (18) | 1 (8) | 2 (17) | 2 (17) | 2 (20) | 10 (16) |
| Acute and Chronic | 4 (6) | 1 (25) | 0 (0) | 1 (25) | 1 (25) | 4 (6) |
| Chronic | 25 (38) | 3 (12) | 9 (36) | 6 (25) | 10 (42) | 24 (39) |
| Negative | 25 (38) | 4 (16) | 9 (36) | 3 (13) | 3 (13) | 24 (39) |
| Total | 66 | 9 (14) | 20 (43) | 12 (23) | 16 (35) | 62 |

Complications by POD14 by BMI



Association between BMI and wound healing complications



Results

- 68 patients were included. 13% of patients were underweight, 29% normal weight, 35% overweight, and 22% obese.
- POD-14 complications occurred in 22% of underweight patients, 15% of normal weight, 38% of overweight, and 40% of obese patients. Of all recorded complications, 75% of patients were overweight or obese.
- Complication rates were not significantly different based on osteomyelitis status. The most common cultures identified in wounds were *P. aeruginosa*, *S. aureus*, and *E. coli*. Negative cultures were found in 22% of closed wounds and 13% of open wounds.

Conclusions

- Our findings suggest that BMI may be correlated with early wound status and the incidence of postoperative complications
- Osteomyelitis status does not have a significant impact on wound healing outcomes
- Future studies should further evaluate the effect of BMI on pressure ulcer associated complications. This may further guide preoperative planning and patient expectations.
- More work must be done to improve wound healing outcomes in patients with higher BMI
 - Closure techniques
 - NPWT

References

- 1) Edsberg LE, Black JM, Goldberg M, McNichol L, Moore L, Sieggreen M. Revised National Pressure Ulcer Advisory Panel Pressure Injury Staging System: Revised Pressure Injury Staging System. *J Wound Ostomy Continence Nurs.* 2016;43(6):585-597. doi:10.1097/WON.0000000000000281
- 2) Moore Z, Cowman S, Conroy RM. A randomised controlled clinical trial of repositioning, using the 30° tilt, for the prevention of pressure ulcers. *J Clin Nurs.* 2011;20(17-18):2633-2644. doi:10.1111/j.1365-2702.2011.03736.x
- 3) Qaseem, A.; Mir, T.P.; Starkey, M.; Denberg, T.D. Risk Assessment and Prevention of Pressure Ulcers: A Clinical Practice Guideline From the American College of Physicians. *Ann. Intern. Med.* 2015, 162, 359–369.
- 4) Mäki-Turja-Rostedt S, Leino-Kilpi H, Koivunen M, Vahlberg T, Haavisto E. Consistent pressure ulcer prevention practice: The effect on PU prevalence and PU stages, and impact on PU prevention-A quasi-experimental intervention study [published online ahead of print, 2022 Dec 30]. *Int Wound J.* 2022;10.1111/iwj.14067. doi:10.1111/iwj.14067
- 5) Lyder CH. Pressure Ulcer Prevention and Management. *JAMA.* 2003;289(2):223–226. doi:10.1001/jama.289.2.223