



Introduction

- Mastectomy skin flap necrosis incidence:¹
 - Implant-based: 8.1% to 41.2%
 - Autologous: 15.2% to 45.5%
- Leads to lengthened recovery times, decreased patient satisfaction, and high healthcare expenditures
- Intraoperative assessments of skin flap viability:²⁻⁴
 - Fluorescence-assisted indocyanine angiography
 - Laser-assisted indocyanine angiography
 - Optical diffusion imaging spectroscopy
- All **costly and not readily available**
- **Aim 1: investigate the role of surface area as an independent risk factor**
- **Aim 2: evaluate clinical breast measurements as a useful adjunct to predict necrosis**

Methodology

- Retrospective case series study, 2011 to 2021, single tertiary care institution
- **5 measurements** collected on initial consultation visit:
 - Nipple-notch distance, nipple-inframammary fold distance, chest width, breast circumference, breast height
- Breast skin surface area modeled using:
 - Surface area of cone without base
 - Surface area of half ellipsoid

Methodology

- Primary outcome of interest: mastectomy skin flap necrosis
 - Any skin compromise requiring topical wound care or excision in the 6-month postoperative period

Figure 1. Preoperative clinical measurements

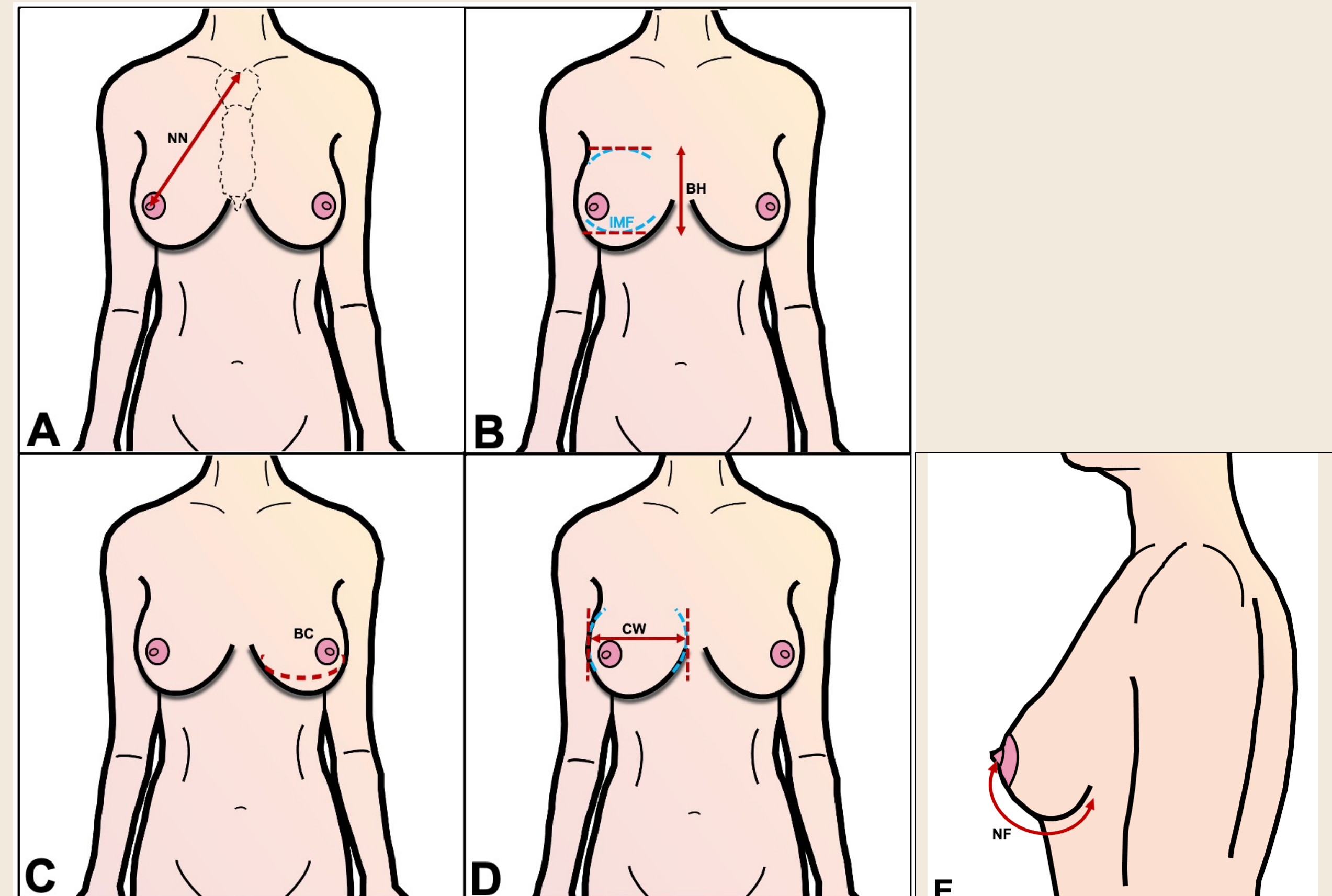
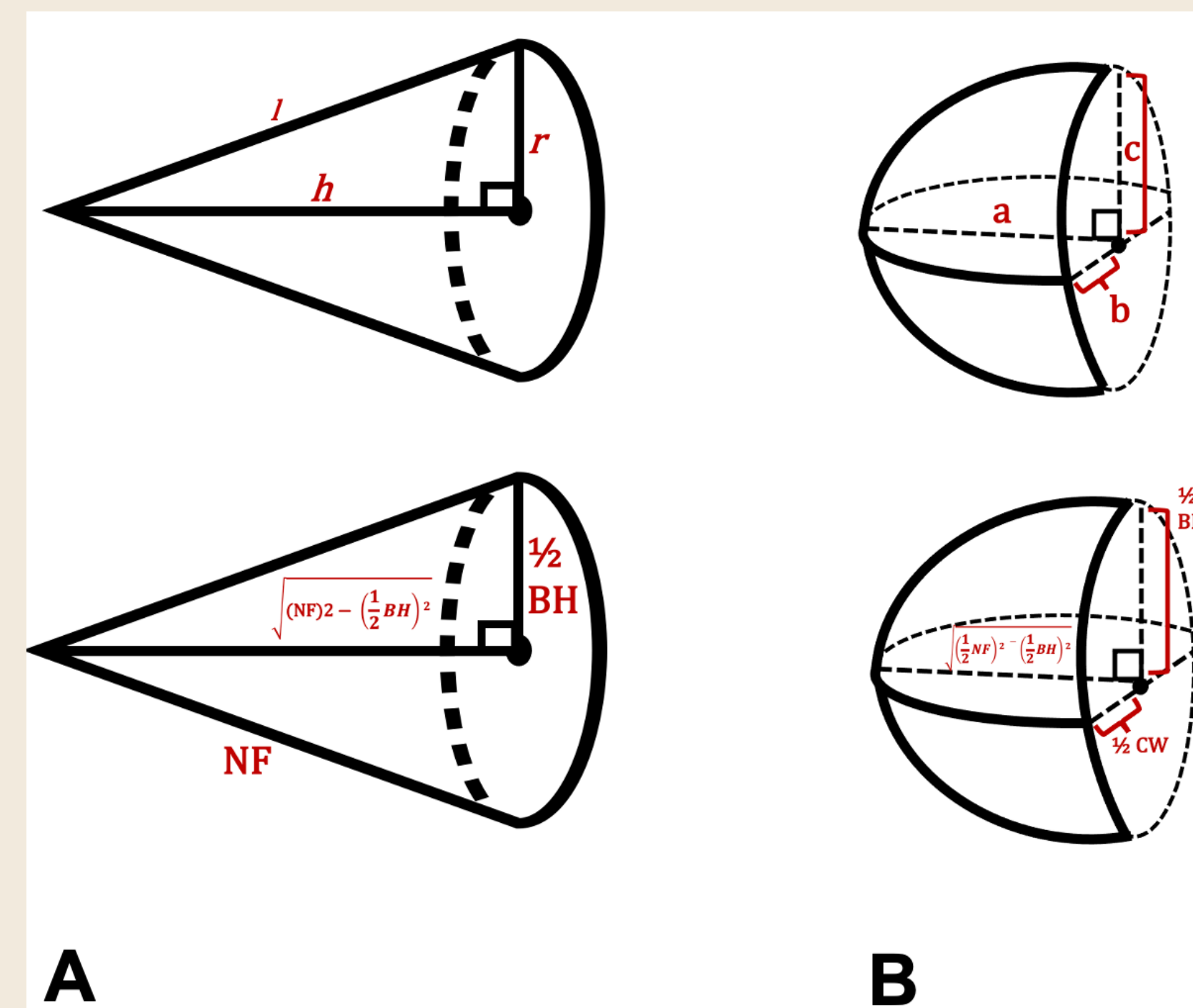


Figure 2. Surface area models using A) cone without base and B) half ellipsoid



Results

- Over **10-year-period, 545 patients**
- **Larger surface area significant risk factor for necrosis**
 - Using surface area of cone without base: $> 212 \text{ cm}^2$ ($p = 0.027$)
 - Using surface area of half ellipsoid: $> 308 \text{ cm}^2$ ($p = 0.022$)
- **Larger measurements positive predictor of necrosis**
 - Nipple-notch distance: $> 27 \text{ cm}$ ($p < 0.001$)
 - Nipple-inframammary fold distance: $> 8.5 \text{ cm}$ ($p < 0.001$)
 - Chest width: $> 15 \text{ cm}$ ($p < 0.001$)
 - Breast circumference: $> 29 \text{ cm}$ ($p < 0.001$)
 - Breast height: $> 10.5 \text{ cm}$ ($p = 0.005$)

Conclusions

- Regardless of which model used to estimate surface area, larger surface an independent risk factor for necrosis
- Preoperative clinical measurements can be useful adjuncts
- Can be used to guide preoperative counseling and surgical planning
 - High risk: skin reduction surgeries prior to mastectomy, banking skin in autologous reconstructions, use intraoperative laser angiography

References

1. Sullivan SR, Fletcher DRD, Isom CD, Isik FF. True incidence of all complications following immediate and delayed breast reconstruction. *Plast Reconstr Surg.* 2008;122(1):19-28.
2. Phillips BT, Lanier ST, Conkling N, et al. Intraoperative perfusion techniques can accurately predict mastectomy skin flap necrosis in breast reconstruction: results of a prospective trial. *Plast Reconstr Surg.* 2012;129(5):778e-788e.
3. Khavanin N, Qiu C, Darrach H, et al. Intraoperative Perfusion Assessment in Mastectomy Skin Flaps: How Close are We to Preventing Complications? *J Reconstr Microsurg.* 2019;35(7):471-478.
4. Rao R, Saint-Cyr M, Ma AM, et al. Prediction of post-operative necrosis after mastectomy: a pilot study utilizing optical diffusion imaging spectroscopy. *World J Surg Oncol.* 2009;7:91.