The Relationship Between Chemotherapy-Induced Peripheral Neuropathy and Underlying Inflammatory Skin Disorders

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BACKGROUND

- Chemotherapy-induced peripheral neuropathy (CIPN) is a common adverse conditions due to chemotherapy[1].
- The development of CIPN can lead to patients being unable to tolerate chemotherapy and subsequent discontinuation[2,6].
- Current literature has established cytokine-driven interactions between skin and neuronal cells that occur during inflammatory skin disease[2].
- Grace Shin Lab at Ohio State:
  - Paclitaxel, a common chemotherapy drug, affects keratinocytes:
    - Reduced cell junctions at desmosomes
    - Increased DNA damage
    - Decreased proliferation
- This nerve-skin relationship could explain the predisposition to developing CIPN in patients with existing skin diseases receiving chemotherapy.

STUDY AIMS

- This study investigates the incidence of CIPN among patients who underwent chemotherapy with and without an underlying skin disease.
- Additionally, we determine whether the development of CIPN is associated with increased rates of hand-foot syndrome (HFS).

METHODS

- The primary data source for this study was the Ohio State Information Warehouse.
- *Inclusion criteria included:*
  - Age of 18 or older, diagnosed with cancer, completed chemotherapy between May 2010 and May 2023
- *Data collected:*
- Age at the time of cancer diagnosis, sex, race, ethnicity
- Information regarding dermatologic conditions, cancer diagnoses, chemotherapy regimens, and side effects from chemotherapy
- *Statistical analysis:* Multinomial logistic regression was used to assess variables of interest. Statistical significance was set at p-value < 0.05.

RESULTS & DISCUSSION

TABLE 1. Cohort Demographics and Rates of CIPN and HFS

		N	Percentage
Sex	Female	8126	53.0%
	Male	7204	47.0%
Race	Other Race	550	3.6%
	Black	1802	11.8%
	White	12978	84.7%
Age at Chemo Initiation	Mean (SD)	61.4 (11.5)	-
CIPN	Yes	1615	10.5%
	No	13715	89.5%
HFS	Yes	69	0.5%
	No	15261	99.5%
Inflammatory Derm Dx Timing (Relative to Cancer Dx date)	iDerm Dx Before	1273	8.3%
	iDerm Dx After	664	4.3%
	No iDerm Dx	13393	87.4%
Total		15330	100.0%

Demographic Factors

- **Female sex** is significantly associated with **higher odds of CIPN** *(OR = 2.16, p-value < 0.001).*
- **Black patients** had **lower odds of developing CIPN** compared to White patients *(OR = 0.84, p-value = 0.04).*
- **Age**: Slightly protective against CIPN with increasing age *(OR = 0.99, p-value = 0.007).*

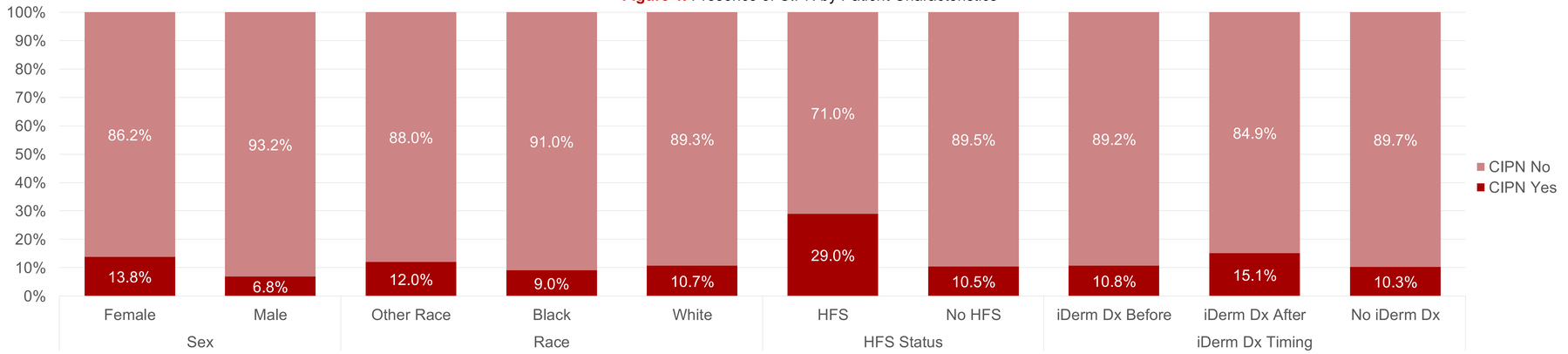
Role of Dermatologic Conditions

- A dermatological diagnosis **after chemotherapy initiation** is modestly associated with **CIPN** *(OR = 1.36, p-value 0.01).*

Interdependence between CIPN and HFS

- Patients with **CIPN had a significantly higher likelihood of developing HFS** *(OR = 2.77, p-value = 0.002).*

Figure 1. Presence of CIPN by Patient Characteristics



CONCLUSION

- Patients who develop CIPN are more likely to be female and less likely to be Black.
- CIPN patients are more likely to be diagnosed with a dermatological condition after their cancer diagnosis.
  - This could imply **increased surveillance or late-onset skin toxicity** following chemotherapy.
- CIPN patients are more likely to develop HFS as well when compared to cancer patients without CIPN.
  - This suggests **a strong relationship between these two chemotherapy toxicities**, possibly due to shared pathological mechanisms or treatment regimens.

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