Gestational Age's Impact on the Incidence of Postpartum Thyroiditis

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Abstract

Goal: Investigate potential relationship between postpartum thyroiditis (PPT) and gestational age

- Preterm delivery (PTD) - < 37 weeks' gestation
- Full-term delivery (FTD) - 37+ weeks' gestation

Hypothesis: Gestational age may have an effect on the incidence of PPT

- T3/T4 increases throughout pregnancy.
- Transplacental diffusion of thyroid hormones occurs

TriNetX 2016-2024 data utilized

- 580,614 FTD pts; 103, 515 PTD pts

Outcome analysis = no significant difference between FTD and PTD groups (p=.757)

Introduction

- Postpartum thyroiditis (PPT) is a peripartum autoimmune disease where anti-thyroid peroxidase (TPO) antibodies attack the thyroid gland[1]
  - Hypothyroid, hyperthyroid, or asymptomatic clinical presentations may occur[1]
  - Occurs within 1 year of delivery[1]
- American College of Obstetricians and Gynecologists and American Thyroid Association lack universal screening protocol for thyroid dysfunction in pregnant pts[2]
  - Test/screen pts with previous autoimmune history[2]
- Hypothesis: PPD will significantly differ b/t PTD and FTD groups
  - Gestational age is directly related to peripartum thyroid hormone levels[3]
  - T3/T4 passed transplacentally to fetus[3]
  - Potential association between PTD and PPT - not explored

Methods

- TriNetX United States Collaborative Network (retrospective, deidentified patient data)
  - ICD-10 codes (e.g., E06, O90.5) for primary patient selection.
  - Calculate frequency counts, mean, SD, OR, 95% CI
    - Used 0.10 SD caliper + propensity score matching to adjust for confounders
      - FTD: 585,666; PTD: 103,515 patients
- G*Power for a priori power analysis
  - Effect size = 0.2; power = 99.95
  - Required 1,436 patients to meet assessment criteria (α = 0.05)

Table 1: Demographics before and after propensity score matching

	Before Propensity Score Matching				After Propensity Score Matching			
Demographics	Pre-Term	Full-Term	SMD	p value	Pre-Term	Full-Term	SMD	p value
Total Number of Patients	102,603	580,614	--	--	102,599	102,599	--	--
Age at Index, mean ± SD	29.3 ± 5.9	29.1 ± 5.7	0.035	<.001	29.3 ± 5.9	29.3 ± 5.9	0.002	.616
Race, N (%)								
American Indian or Alaska Native	569 (0.6)	1,906 (0.3)	0.034	<.001	569 (0.6)	598 (0.6)	0.004	.395
Asian	4,591 (4.5)	35,507 (6.1)	0.073	<.001	4,591 (4.5)	4,580 (4.5)	<0.001	.906
Black or African American	20,912 (20.4)	96,114 (16.6)	0.099	<.001	20,908 (20.4)	20,925 (20.4)	<0.001	.926
Native Hawaiian or Other Pacific Islander	446 (0.4)	1,944 (0.3)	0.016	<.001	446 (0.4)	446 (0.4)	<0.001	1
White	56,329 (54.9)	337,341 (58.1)	0.065	<.001	56,329 (54.9)	56,267 (54.8)	0.001	.783
Other Race	6,622 (6.5)	42,090 (7.2)	0.032	<.001	6,622 (6.5)	6,628 (6.5)	<0.001	.957
Unknown Race	13,134 (12.8)	65,712 (11.3)	0.046	<.001	13,134 (12.8)	13,155 (12.8)	<0.001	.890
Ethnicity, N (%)								
Hispanic or Latino	22,133 (21.6)	129,898 (22.4)	0.019	<.001	22,133 (21.6)	22,156 (21.6)	<0.001	.902
Not Hispanic or Latino	61,460 (59.9)	369,783 (63.7)	0.078	<.001	61,460 (59.9)	61,391 (59.8)	0.001	.756
Unknown Ethnicity	19,010 (18.5)	80,933 (13.9)	0.125	<.001	19,006 (18.5)	19,052 (18.6)	0.001	.794

Figure 1: TriNetX data selection

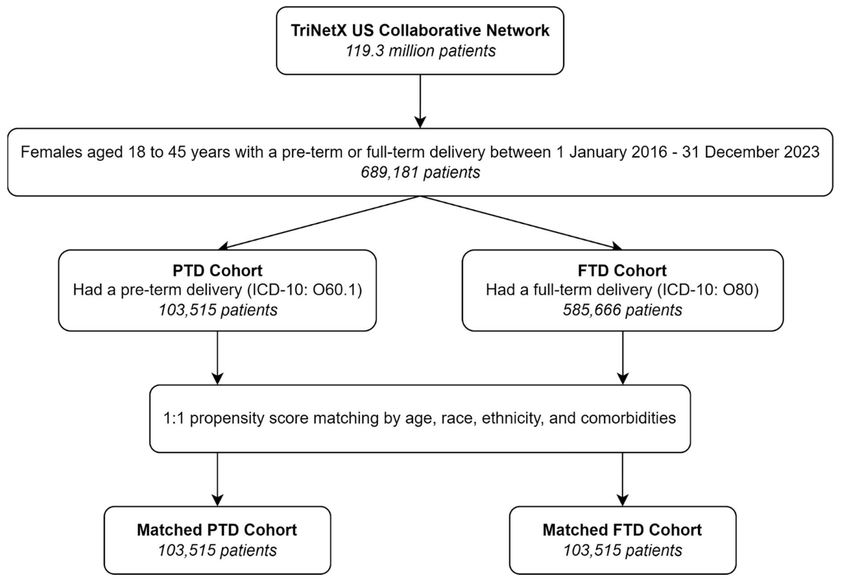
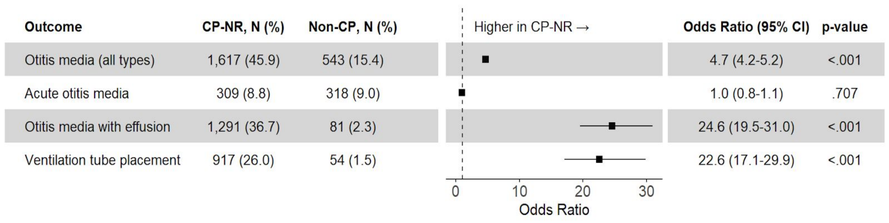


Figure 2: Odds Ratios of outcomes for CP-NR and Non-CP cohorts



Results

- 103,515 pts/cohort plus propensity score matching (Table 1)
  - Prior to PSM:
    - No significant difference between history of postpartum thyroiditis (p = .323) or history of thyroiditis (p = 0.993, Figure 2)
- Within the one-year postpartum period:
  - 0.7% (751) PTD patients had PPT; 0.7% (763) FTD patients had PPT
  - No significant difference between PPT incidence between PTD and FTD cohorts (p = .757, Figure 2)

Discussion

- Hypothesis
  - Original: FTD will be associated with increased odds of PPT due to increasing levels of TSH, T3, and T4 during pregnancy plus transplacental transmission.[2]
    - Reject original, accept H_0 (p = 0.757)
- TriNetX United States Collaborative Network
  - Benefits: Sample community and academic hospitals in a variety of settings (rural, urban, suburban) and locations; exploration of new topic
  - Limitations: Study uniqueness, propensity score matching, TriNetX database use (limited dataset)
- PPT cases may be asymptomatic or present with symptoms attributed to pregnancy, leading to decreased reported incidence[3]

Conclusion

- Data available supporting pre-pregnancy thyroid issues and incidence of postpartum thyroiditis[1]
  - Lack of current data supporting gestational age and PPT incidence
  - Minimal statistical TriNetX evidence provided to support our hypothesis
- Further investigation/different database analysis may yield different results
- Relationship between thyroid function and peripartum outcomes should be discussed by OBGYNs and otolaryngologists
  - Potentially harmful consequences for parent and baby if ignored

References

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