

A systematic review of changes in the endometrium predisposing to preterm labour: A thematic analysis

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Background

Preterm labour (PTL) is a leading cause of mortality and morbidity in infants in the UK (NICE guidelines, 2022). Despite this, mechanisms behind PTL are unclear. Recent studies have suggested structural abnormalities may influence PTL, as the risk was significantly increased with both thinner endometrium and decidual polyps (Zheng et al 2022). Additionally, inflammation has associations with preterm birth, with reduced anti-inflammatory pathways (Zu et al, 2019).

This study explores the role of endometrial structure and inflammation in PTL to provide understanding of mechanisms and treatment targets from a different approach.

Methods

- A systematic review was performed using emergent thematic analysis of studies extracted from MEDLINE, Embase and SCOPUS.

Search: -MESH headings ‘preterm birth’ OR ‘preterm labo?r’ OR premature birth’ OR ‘premature labo?r’ OR ‘preterm premature rupture of membranes’ AND ‘decidua**’ OR ‘endometrial’ OR ‘endometrium’	Exclusion criteria: Non-human studies and reviews Inclusion criteria: Human studies sampling endometrium where participants had experienced PTB, and any study design.	Analysis - Duplicates removed and two independent reviewers assessed abstract and titles of studies for suitability and relevance - Suitable studies were uploaded to Quirkos (Computer Software 2023) and one reviewer identified overarching themes
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Results

- The search revealed 3489 studies with 1126 duplicates.
- 2363 studies were then screened by title and abstract by two independent reviewers for relevance to the study’s aims, resulting in 12 extracted for thematic analysis.
- Two key themes were identified – structural abnormalities in the endometrium, and endometrial inflammation. Themes and subthemes are displayed in figure 1.

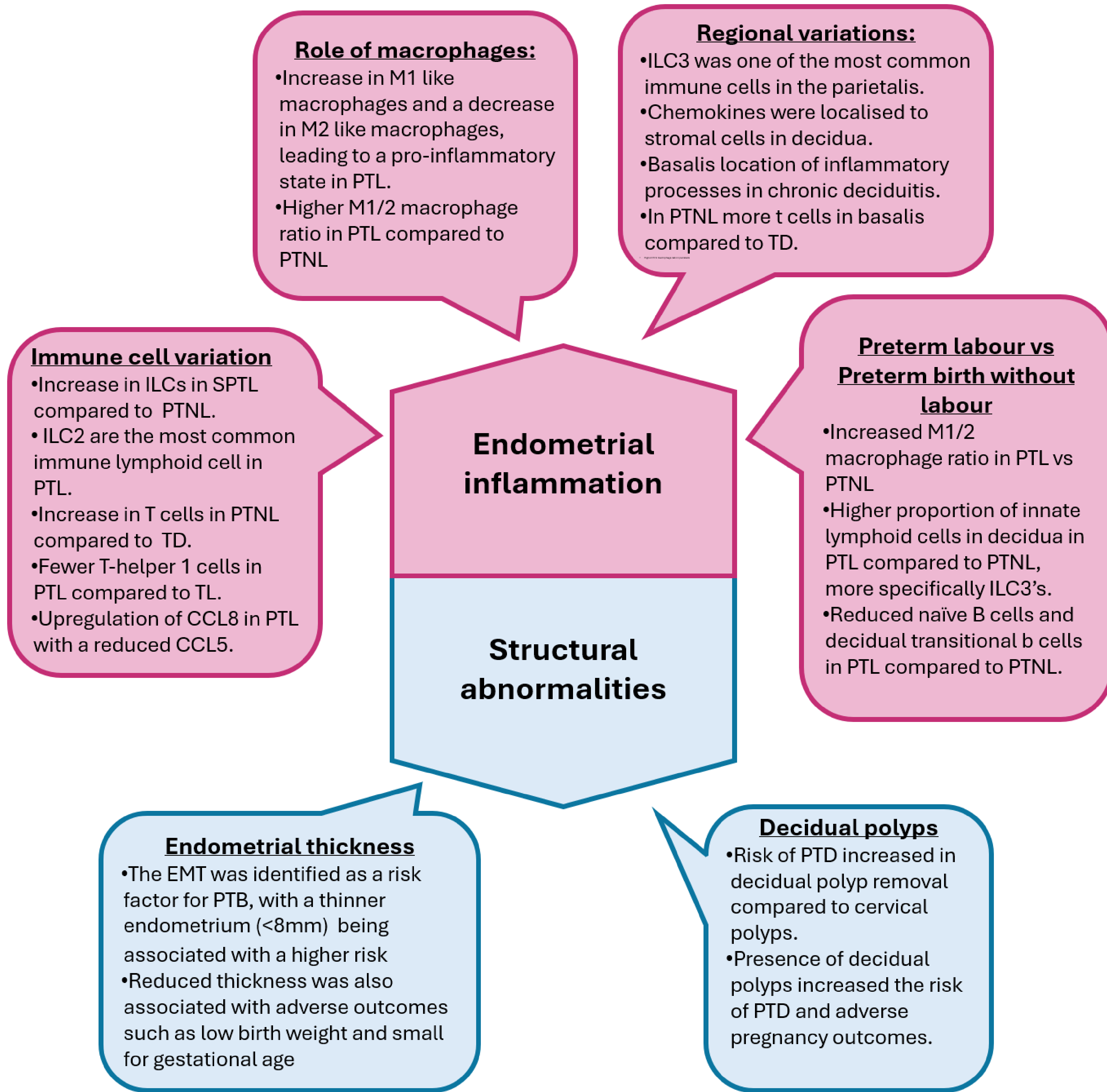


Figure 1: Themes and their subthemes identified within the extracted articles. PTB: Preterm birth. PTNL: Pre-term not in labour. ILC: Innate lymphoid cells. TD: Term delivery. CCL: chemokine ligand. SPTL: spontaneous preterm labour.

Discussion

Two key themes were identified: endometrial inflammation and structural abnormalities:

- Endometrial thickness of <8mm was associated with worse outcomes and increased PTB, possibly due to poor vascularisation. Inadequacy may lead to PTL (Miwa et al,2009). Gill et al (2023) however found EMT has no association with PTB
- Proinflammatory changes in the environment due to macrophage polarisation may trigger PTL. Changes in quantities of immune cells between term and preterm labour could display immune cells being altered due to the environment. Inflammatory differences in PTL and PTNL implies increased inflammatory responses during preterm labour, which may be a trigger or the result of PTL initiation.

Premature decidual senescence is an alternative approach to endometrial influence on PTL; decidual cells are vital to pregnancy maintenance therefore their growth arrest may impact PTL (De La Torre, Fernández-de la Torre and Flores, 2021). Additionally, intrauterine bleeding causes tissue factor production from the endometrium, a uterotonic agent, thus possibly triggering premature contractions (Elovitz et al, 2000).

These findings may expand research of novel treatments and prevention strategies of PTB focusing on endometrial causation factors whilst identifying pregnancies at risk.

Conclusion

Several key themes were identified displaying the endometrial role in preterm labour consisting of inflammatory and structural influences. The findings may lead to further research into the role of the endometrium in PTB and how this can be targeted to develop potential treatment and prevention strategies.

References

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