



The Impact Of Vascular Abnormalities On The Quality Of Life Of Patients With Perthes Disease Without Surgical Intervention: A Narrative Review

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Abstract :

Background: Perthes disease (Legg–Calvé–Perthes Disease, LCPD) is a rare pediatric condition caused by disruption of blood supply to the femoral head, resulting in avascular necrosis. Although its etiology remains unclear, vascular abnormalities and coagulation disorders have been implicated. These pathophysiological changes often compromise mobility, pain tolerance, and psychosocial well-being, thereby reducing quality of life (QoL).

Objective: To review the impact of vascular abnormalities on quality of life in patients with Perthes disease managed conservatively (without surgical intervention).

Methods: A narrative review was conducted using PubMed, Scopus, ScienceDirect, Google Scholar, and Research Gate. Literature published between 2006 and 2024 was screened using “MESH Technique : *Perthes disease, vascular abnormalities, quality of life, non-surgical*” management. Inclusion criteria focused on non-surgical management, vascular changes, and QoL assessment. Forty articles met eligibility criteria.

Results: Evidence shows that vascular abnormalities, particularly coagulation disorders such as Factor V Leiden mutations and thrombophilia, contribute significantly to disease progression. Patients frequently reported reduced QoL, with impairments in pain-free mobility, school attendance, sleep, and psychosocial well-being. Studies using validated QoL scales (EQ-5D) consistently indicated poorer outcomes compared to healthy populations.

Conclusion: Vascular abnormalities in Perthes disease play a critical role in determining prognosis and quality of life. Non-surgically managed patients often experience persistent pain, functional limitations, and psychosocial challenges. Early detection, conservative management, and psychosocial support are essential.

Keywords: Perthes disease, Legg-Calvé-Perthes disease, vascular abnormalities, quality of life,

INTRODUCTION

Perthes disease, or Legg–Cavé–Perthes Disease (LCPD), is a self-limiting childhood hip disorder characterized by avascular necrosis of the femoral head due to disrupted blood supply. It predominantly affects children between 4–10 years, with a male-to-female ratio of 4–5:1 and an incidence of approximately 1 in 9,000 children globally. In India, cases are more prevalent in southern coastal regions.¹

The condition progresses through four stages: osteonecrosis, fragmentation, re-ossification, and healing. Risk factors include genetic predispositions (e.g., Factor V Leiden), thrombophilia, low birth weight, exposure to secondhand smoke, and lower socioeconomic status.²

Vascular abnormalities directly affect disease severity and patient outcomes, influencing not only the musculoskeletal system but also the psychosocial quality of life. This review explores these impacts in conservatively managed patients.³

NEED OF THE STUDY.

Perthes disease is a rare pediatric hip disorder where vascular abnormalities play a crucial role in the onset and progression of avascular necrosis of the femoral head. Although surgical interventions have been widely studied, there is limited evidence regarding the outcomes of patients managed conservatively, particularly in relation to their quality of life. Most existing research focuses on structural and radiographic changes, while psychosocial and functional aspects remain underexplored.

Given that children with Perthes disease often experience persistent pain, restricted mobility, impaired participation in daily activities, and psychological stress, it is essential to evaluate how vascular abnormalities influence these outcomes in the absence of surgical intervention. Understanding this association will not only help clinicians identify at-risk patients early but also guide the development of comprehensive physiotherapy, rehabilitation, and psychosocial support strategies.

This study is therefore needed to bridge the gap between clinical pathology and patient-centered outcomes by highlighting the role of vascular abnormalities in determining the quality of life in conservatively managed Perthes disease patients.

RESEARCH METHODOLOGY

This study employs a **narrative literature review** to synthesize current evidence on Perthes disease, vascular abnormalities, and quality of life outcomes in patients managed non-surgically. The narrative approach allows for an in-depth discussion of conceptual and clinical findings, highlighting patterns, gaps, and emerging themes across the literature.⁵

Literature Search Strategy

A comprehensive literature search was conducted across multiple electronic databases to ensure thorough coverage:

- **PubMed**
- **Scopus**
- **Google Scholar**
- **ScienceDirect**

The search focused on **peer-reviewed journal articles, review papers, and relevant clinical reports** published in **English between 2006 and 2024**.

Search keywords included:

- “Perthes disease” OR “Legg-Calve-Perthes disease”
- “Vascular abnormalities” OR “vascular disruption” OR “avascular necrosis”
- “Quality of Life” OR “QoL” OR “life satisfaction”
- “Non-surgical” OR “conservative management” OR “non-operative”

Boolean operators were used to combine keywords and refine results relevant to non-surgical management, vascular status, and quality of life outcomes.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Studies focusing on patients with Perthes disease managed without surgical intervention
- Articles discussing vascular changes or abnormalities in the femoral head or hip
- Studies assessing any dimension of quality of life (physical, mental, social)
- Full-text articles published in English

Exclusion Criteria:

- Studies involving surgical or post-surgical patients
- Articles focusing purely on surgical techniques or outcomes
- Non-peer-reviewed literature, editorials, and conference abstracts
- Studies lacking information on vascular status or quality of life

Data Extraction and Analysis

Key information was systematically extracted from the selected studies, including:

- Author(s) and publication year
- Study design and sample characteristics
- Description of vascular abnormalities
- Quality of life measures used (e.g., questionnaires, patient reports)
- Main findings and conclusions

The extracted data were organized thematically, focusing on patterns related to:

- Pain and mobility
- Psychosocial functioning
- Disease progression and prognosis
- Impact of vascular changes on long-term quality of life

A **narrative synthesis** was employed to integrate and interpret findings across studies, highlighting areas of agreement, divergence, and gaps in the literature.

Although formal scoring or quality appraisal was not applied, emphasis was placed on **methodological rigor** and **relevance**. Preference was given to studies with

- Clear inclusion criteria
- Appropriate diagnostic methods for vascular assessment
- Validated instruments for assessing quality of life



3.4 Statistical tools

As this study is based on a narrative review of existing literature, no primary statistical testing was directly performed on patient data. Instead, the analysis was carried out through systematic data extraction, organization, and narrative synthesis.

The following steps were undertaken:

1. Descriptive Summarization

Frequencies and proportions of studies focusing on vascular abnormalities, coagulation disorders, and quality of life (QoL) were recorded.

Patterns in sample size, population characteristics, and outcome measures were noted.

2. Comparative Interpretation

Reported statistical findings from the included studies were collated, including odds ratios, hazard ratios, p-values, and confidence intervals (where available).

Quality of Life outcomes were compared using validated scales such as EQ-5D and Modified Harris Hip Score, highlighting differences between Perthes patients and healthy controls.

3. Thematic Synthesis

Extracted results were grouped thematically into domains such as pain and mobility, psychosocial well-being, and vascular influence on prognosis.

Instead of conducting meta-analysis, a narrative synthesis approach was applied due to heterogeneity in study designs, outcome measures, and patient populations.

4. Evidence Weighting

Greater emphasis was placed on studies with robust methodology, larger sample sizes, and validated QoL instruments.

Findings from smaller-scale or case-based studies were included to illustrate trends but interpreted cautiously.

This approach ensured a structured integration of statistical evidence from the reviewed literature while maintaining focus on the relationship between vascular abnormalities and quality of life in conservatively managed Perthes disease patients.

IV. RESULTS AND DISCUSSION

4.1 Results of Descriptive Statics of Study Variables

Journal Name	Pathophysiology leading to vascular abnormalities	Impact on Quality of Life
The Journal of Bone and Joint Surgery	7	15
Journal of Pediatric Orthopaedics	10	12
Clinical Orthopaedics	8	9
American Journal of Sports Medicine	11	5

Table 4.1: Descriptive Statics

We searched 100 articles including books and peer reviewed research article searched with the keywords Perthes disease, vascular abnormalities, quality of life and Perthes disease with no surgical interventions out Of 100. We included 40 articles which met our inclusion criteria. We found that there are significant Relationship between co-agulation abnormalities and quality of life in patient of Perthes disease with no Surgical interventions. Hence null hypothesis of this study is accepted. In perthes disease disruption of the blood supply leads to infarction of the femoral capital epiphysis, particularly

The subchondral cortical bone. Subsequently, this leads to a cessation of the growth of the ossific nucleus. The

infected bone softens and dies.[8-4]

It could be due to that in our review we found that presence of factor V in the biochemical test done in Perthes

disease leads to coagulation abnormalities in such population. [20-9]

We also found that Perthes' disease may reflect a wider vascular phenomenon that could have long-term implications for the vascular health of affected individuals. [19-10]

In consequences we also have found that children with LCPD have lower quality of life. [9-11]

Perthes' disease significantly affects daily life with experience of pain; inhibiting play and activities, limiting

school attendance, and interfering with sleep. These factors negatively affect the social, physical, and emotional

quality of life of the affected child and their wider family. [19]

Did her studies on QoL using Modified Harris Hip Score where it showed that children with perthes disease had a score less than 70 pts which indicated poor QoL. [20]

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