Pigmented Villonodular Synovitis (PVNS) of the Hip Managed with Arthroscopic Synovectomy: An Analysis of 14 Cases with an Average of 6-year Follow-up


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Background

- Pigmented Villonodular Synovitis (PVNS) is a monoarticular, benign tenosynovial giant cell tumor, derived from synovial tissue
- Incidence: rare, 1.8 cases per million people
- Location: Knee is most common, followed by the Hip → 15% of cases
- Variable presentation:
  - Synovial Involvement: Localized vs Diffused
  - Level of Aggression: Slow, Benign vs Invasive, Malignant-like
  - Morphology: Villous vs Nodular

Villous type or thread-like PVNS lesions on arthroscopic view (black arrow)
Background

- Typically seen on MRI after a patient presents with **insidious joint pain**
- Classically treated with open synovectomy, **arthroscopic management** has shown promise with **favorable outcomes and acceptable recurrence rates**
- **Purpose:** To add to the paucity of literature on the arthroscopic management of hip PVNS, by demonstrating **favorable outcomes and low recurrence** at an average of **6-year follow-up**

Globous type PVNS lesions on arthroscopic view (*asterisk*)
Methods

- **Retrospective cohort analysis** of all patients who underwent hip arthroscopy between July 2008 and August 2013; PROMs and VAS pain score were **Prospectively collected**
- PVNS was identified preoperatively based on MRI or intraoperatively after unexpected PVNS was identified during arthroscopy for another pathology
- **Inclusion:** hip arthroscopy, biopsy-proven PVNS, and follow-up of a minimum of 3-years
- **Exclusion:** <3-years follow-up, incomplete PROMs
- **Outcomes:**
  - Recurrence of PVNS
  - Revision: arthroscopy or arthroplasty
  - PROMs:
    - mHHS—modified Harris Hip Score; **NAHS**—Non-Arthritic Hip Score; **LEFS**—Lower Extremity Function Score; **HOS**—Hip Outcome Score; **iHOT-33**—International Hip Outcome Tool

**Pain, Patient Satisfaction and Complications**
(A) MRI T1-weighted sagittal image of the right hip, demonstrating **hypo-intense “blooming” artifact** *(white arrow)* with **infiltration of the entire joint space** *(asterisk and double asterisk)*

(B) MRI T1-weighted sagittal image of the right hip, demonstrating the **significant amount of posterior invasion** *(double asterisk)* of the peripheral compartment.
Results

- Total cohort: 14 hips (14 unique patients)
- Avg Age: 33.4 ± 4.17 years
- Male: 6 (43%) vs Female: 8 (57%)
- Mean patient follow-up: 6.7 ± 1.87 years
  - Range: 47—117 months
- Morphology:
  - Diffuse type: 5 (36%)
  - Nodular type: 9 (64%)
- Patient Satisfaction: Yes—14 (100%)

- Would choose the same treatment again?: Yes—14 (100%)
## Results

### PVNS of Hip Managed by Arthroscopic Synovectomy — 6yr follow-up

**Table 1. PROMs at Latest Follow-up**

<table>
<thead>
<tr>
<th></th>
<th>Total Cohort</th>
<th>Diffuse vs Nodular</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Result</td>
<td>Diffuse Type</td>
</tr>
<tr>
<td>mHHS</td>
<td>74.1 ± 16.8</td>
<td>63.4 ± 16.9</td>
</tr>
<tr>
<td>NAHS</td>
<td>78.9 ± 20.0</td>
<td>71.0 ± 18.6</td>
</tr>
<tr>
<td>LEFS</td>
<td>64.9 ± 17.9</td>
<td>59.0 ± 17.2</td>
</tr>
<tr>
<td>HOS—ADL</td>
<td>57.5 ± 12.5</td>
<td>52.2 ± 9.8</td>
</tr>
<tr>
<td>HOS—SSS</td>
<td>73.7 ± 29.2</td>
<td>59.4 ± 31.4</td>
</tr>
<tr>
<td>iHOT—33</td>
<td>67.9 ± 27.4</td>
<td>56.0 ± 24.4</td>
</tr>
</tbody>
</table>

* = p-value < 0.05  ** = p-value < 0.01  *** = p-value < 0.001
## Results

### Table 2. Pain Score and PVNS Recurrence

<table>
<thead>
<tr>
<th></th>
<th>Total Cohort</th>
<th>Diffuse vs Nodular</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>p-value</td>
</tr>
<tr>
<td>Pain Relief—Yes</td>
<td>12 (86%)</td>
<td><strong>0.016</strong>*</td>
</tr>
<tr>
<td>VAS Pain Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>8.1 ± 1.1</td>
<td>--</td>
</tr>
<tr>
<td>Postoperative</td>
<td>3.2 ± 1.8</td>
<td>--</td>
</tr>
<tr>
<td>Difference</td>
<td>-4.9 ± 1.7</td>
<td><strong>2.19x10^{-8}</strong>*</td>
</tr>
<tr>
<td>Recurrence</td>
<td>1 (7%)</td>
<td>0.164</td>
</tr>
<tr>
<td>Revision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthroscopy</td>
<td>1 (7%)</td>
<td>0.164</td>
</tr>
<tr>
<td>Arthroplasty</td>
<td>0 (0%)</td>
<td>--</td>
</tr>
</tbody>
</table>

* = p-value < 0.05  
** = p-value < 0.01  
*** = p-value < 0.001
Limitations

• This study has a **small sample size** and further investigation with larger cohorts is necessary.

• There was **no comparison group** because all patients that presented with hip PVNS were treated similarly, there was no cohort of patients treated with open synovectomy.

• However, there is only one other study that we are aware of that has a similar sample size and follow-up beyond 5-years: **Byrd et al with 13 patients with a mean f/u of 63 months**.

• This study adds to the **paucity of literature** on arthroscopic managed hip PVNS, with **14 patients with a mean f/u of 79 months**.
Conclusion

- **Conclusion:** Arthroscopic management of hip PVNS is a promising surgical approach that provides **safe, reliable, and durable favorable outcomes**
- To our knowledge, this is the one of the largest cohorts of *arthroscopic-managed* hip PVNS with the longest reported follow-up of: average of 6.7 years
- PROMs show **Fair hip functionality**, with no difference between Diffuse and Nodular
- **Statistically Significant:**
  - 86% patients reported relief of pain
  - VAS pain score **decreased by 4.9 points**
  - Greater pain reduction in Diffuse type PVNS
- 0 major or minor complications
- **Only 1 (7%) recurrence**, managed with a revision arthroscopy
- **100% Patient Satisfaction**, 100% would choose the treatment again
PVNS of Hip Managed by Arthroscopic Synovectomy—6yr follow-up
References

1. Upadhyaya S, Alpaugh K, Martin SD. Highly Erosive Tenosynovial Giant Cell Tumor of the Hip Treated with Arthroscopic Synovectomy. 2015. 16:75-81