Superficial CD34+ fibroblastic tumor: clinicopathological, molecular and cytogenetic study of 7 cases

Authors: Raul Perret*, Richard Carr#, Jessica Massière &, Jean-Michel Coindre* and François Le Loarer*

*Department of Biopathology - Bergonié Institute, Bordeaux, France
#Department of Histopathology - Warwick Hospital, Warwick, UK
&INSERM U1812, Bergonié Institute, Bordeaux, France
Disclosure Information

I, Raul Perret have no conflicts of interest to declare.
Superficial CD34 + Fibroblastic Tumor (CD34FT)

- Soft tissue neoplasm described in 2014 by Carter JM et al.*

- Characterized by superficial location, diffuse CD34 expression, poorly proliferative spindle and pleomorphic cells.

- Provisionally classified in the intermediate malignancy group (1/18 lymph node spread)

- Histological resemblance with Pleomorphic Hyalinizing Angiectatic Tumor (PHAT), Myxoinflammatory Fibroblastic Sarcoma (MFS), and PRDM10-rearranged Soft Tissue Tumor (PRDM10-STT).*#
Images from Carter JM et al. *

Images from Puls F et al. **

*PMID: 23887307

**PMID: 30570551
Objective

To perform a comprehensive study of an additional series of CD34FT in order to clarify its nosological status

Genomic / Transcriptomic link with MFS / PHAT / PRDM10-STT?

- Anomalies reported in PHAT / MFS / Hybrid HFLT-MFS
  - TGFBR3 and MGEA5 rearrangements\(^1,2\)
  - VGLL3 amplification\(^3\)
  - BRAF rearrangement / amplification\(^4\)
- Anomalies exclusively reported in MFS / HFLT
- Anomalies reported in PRDM10-STT
  - PRDM10 rearrangement\(^5\)

---

1 Carter JM et al. PMID: 24705316
2 Rougemont AL et al. PMID: 30911815
3 Antonescu CR et al. PMID: 21717526
4 Kao YC et al. PMID: 28692601
5 Puls F et al. PMID: 30570551
Methods

- **Case selection:** the archives of Bergonié Institute (France) were searched for cases reported as CD34FT or with features suggestive of this Dx. (diffuse CD34 expression + pleomorphism + low mitotic activity).

- All available material was reviewed and additional studies were performed:
  - Immunohistochemistry
  - Array-Comparative genomic hybridization (aCGH, Agilent platform, 8x60k array)
  - Whole RNA sequencing (RNAseq, Illumina, Truseq-exome)
    - Translocations
    - Mutations
    - Genomic Profiling (Sarcoma Database)
Results

7 confirmed cases of CD34FT - Initial Dx. CD34FT (n=3); Sarcoma, Low grade (n=2); MIFS (n=1); Dermatofibroma (n=1)

2 cases in keeping with classical PHAT - Initial Dx. CD34FT (n=2)

1 case PRDM10 rearranged tumor - Initial Dx. CD34FT

1 case Solitary Fibrous Tumor (SFT) - Initial Dx. on biopsy: in favour of CD34FT

11 cases recovered (ongoing)

Summary of clinical findings of the 7 confirmed cases of CD34FT

- 4 Males and 3 Females with a median age of 33 years old (range: 21 – 54)
- 6 located in the lower limb (buttock, n=3 ; thigh, n=2 ; leg, n=1) and 1 in the shoulder
- 2 tumors sent as local recurrences (36 and 54 months after initial excision)
- 6 suprafascial and 1 intramuscular
Immunohistochemical findings

+ indicates diffuse positivity (>75% cells); +/-, focal positivity (<75% cells); NP, not performed

<table>
<thead>
<tr>
<th>Case</th>
<th>CD34</th>
<th>Pan keratin (AE1-AE3)</th>
<th>EMA</th>
<th>Smooth Muscle Actin</th>
<th>Desmin</th>
<th>Caldesmon</th>
<th>ERG</th>
<th>PS100</th>
<th>BAF47 (INI1)</th>
<th>ALK1</th>
<th>Ki67</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>retained</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>+</td>
<td>+/-</td>
<td>-</td>
<td>NP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>NP</td>
<td>NP</td>
<td>-</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>+</td>
<td>+/-</td>
<td>-</td>
<td>NP</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
<td>NP</td>
<td>NP</td>
<td>-</td>
<td>NP</td>
</tr>
<tr>
<td>4</td>
<td>+</td>
<td>-</td>
<td>NP</td>
<td>NP</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>NP</td>
<td>3%</td>
</tr>
<tr>
<td>5</td>
<td>+</td>
<td>-</td>
<td>NP</td>
<td>-</td>
<td>+/-</td>
<td>-</td>
<td>NP</td>
<td>-</td>
<td>-</td>
<td>NP</td>
<td>NP</td>
</tr>
<tr>
<td>6</td>
<td>+</td>
<td>+/-</td>
<td>NP</td>
<td>NP</td>
<td>+/-</td>
<td>-</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>10%</td>
</tr>
<tr>
<td>7</td>
<td>+</td>
<td>+/-</td>
<td>NP</td>
<td>-</td>
<td>+/-</td>
<td>-</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
<td>NP</td>
</tr>
</tbody>
</table>

CD34FT - Case 6
CD34 - Case 6
Pan keratin
Desmin
Ki67
PHAT
PRDM10-STT
Array-CGH Findings

No significant CNVs
RNA sequencing findings

- No specific translocations or recurrent mutations found (5 tested cases of CD34FT)
- Gene Expression Profiling – Unsupervised Hierarchical clustering
  - CD34FTs, PRDM10-STTs and PHAT cases formed a distinct expression cluster
  - MFS cases formed close but different clusters

Sarcoma Database (Bordeaux-Lyon)

PRDM10-SS (S10)
PRDM10-SS (S12)
PRDM10-SS (R90)
PRDM10-SS (R251)
SCD34FT (case 3)
SCD34FT (case 5)
SCD34FT (case 7)
PHAT
SCD34FT (case 1)
SCD34FT (case 6)
Conclusions

• Our study confirms that CD34FT has overlapping features with PHAT and PRDM10-STT

• Gene expression profiling supports that these entities are part of a spectrum that is close but different from MFS

• Identification of neoplasms in the spectrum of CD34FT is of prime importance as they seem to have mainly a local recurrence potential -> Pleomorphic Sarcoma mimicker!

- Relatively well circumscribed tumor
- Low mitotic activity
- Pleomorphic cells
- No necrosis
- Diffuse CD34 expression
Thank You!

Merci!

@kells108