Real-World Evidence of Synovial Sarcoma: Prognostic Factors and Therapeutic Approaches from Cancer Registry Data

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Background

- Synovial sarcoma (SS) is a rare and aggressive soft tissue cancer, primarily affecting the extremities. Despite advances in treatment, prognosis remains challenging, with survival outcomes influenced by various factors.
- In this context, real-world data offer valuable insights into SS outcomes and treatment trends.
- This study examines the prognostic factors and therapeutic landscape of SS using data from the Baden-Württemberg Cancer Registry (BWCR), Germany.

Methods

- We conducted a retrospective cohort study of adults diagnosed with synovial sarcoma (SS) of the extremities and trunk between 2009 and 2023, as recorded in the Baden-Württemberg Cancer Registry (BWCR).
- Key clinical data, including treatment regimens and survival outcomes, were collected and analyzed.
- Patient groups were compared based on:
  - Histological subtype: monophasic vs. biphasic
  - Age: Younger (<45 years) vs. older (≥45 years)
- Overall survival (OS) was assessed using Kaplan-Meier survival curves and Cox regression models.
- Adjustments were made for age, sex, tumor size, histological subtype (monophasic vs. biphasic), grade, and disease status (localized vs. metastatic).

Results: Baseline characteristics

A total of 248 patients were included in the study, with a median age of 42.5 years

- 50.8% were male
- 62.1% of cases were monophasic, and 37.9% were biphasic.
- 61.2% of tumors were high-grade.
- The majority of tumors were at T1-T2 stage.
- 12% of patients had metastatic disease, with 80% of metastases involving the lungs.

	Overall	biphasic	monophasic	<45y	>45y
Total – no. (%)	248	55 (37.9)	90 (62.1)	134	114
Age – mean (SD)	44.65 (16.95)	39.78 (15.82)	45.03 (16.99)	31.65 (7.31)	59.94 (11.35)
Agegroup – no. (%)					
▪ <45	134 (54.0)	36 (65.5)	45 (50.0)	134 (100.0)	0 (0.0)
▪ >45	114 (46.0)	19 (34.5)	45 (50.0)	0 (0.0)	114 (100.0)
Typ – no. (%)					
▪ biphasic	55 (37.9)	55 (100.0)	0 (0.0)	36 (44.4)	19 (29.7)
▪ monophasic	90 (62.1)	0 (0.0)	90 (100.0)	45 (55.6)	45 (70.3)
Sex – no. (%)					
▪ M	126 (50.8)	27 (49.1)	48 (53.3)	64 (47.8)	62 (54.4)
▪ W	122 (49.2)	28 (50.9)	42 (46.7)	70 (52.2)	52 (45.6)
T-stage – no. (%)					
▪ T1	61 (40.1)	18 (45.0)	20 (40.0)	36 (43.4)	25 (36.2)
▪ T2	76 (50.0)	20 (50.0)	25 (50.0)	38 (45.8)	38 (55.1)
▪ T3-T4	15 (9.8)	2 (5.0)	5 (10.0)	9 (10.8)	6 (8.7)
Grading – no. (%)					
• intermediate	76 (38.8)	17 (34.7)	33 (42.9)	41 (40.6)	35 (36.8)
• high	120 (61.2)	32 (65.3)	44 (57.1)	60 (59.4)	60 (63.2)
stage – no. (%)					
• localized	218 (87.9)	48 (87.3)	81 (90.0)	122 (91.0)	96 (84.2)
• metastatic	30 (12.1)	7 (12.7)	9 (10.0)	12 (9.0)	18 (15.8)
Location – no. (%)					
• Pelvis	8 (3.2)	1 (1.8)	3 (3.3)	4 (3.0)	4 (3.5)
• Extremities	208 (83.9)	51 (92.7)	76 (84.4)	116 (86.6)	92 (80.7)
• Thunk	32 (12.9)	3 (5.5)	11 (12.2)	14 (10.4)	18 (15.8)

Tab 1: Baseline clinical and patient characteristics

Therapy

- The primary treatment modality was surgery (82% with R0-resection)
- 61% of patients receiving radiation in either the neoadjuvant or adjuvant setting.
- In advanced stages, systemic therapy predominantly consisted of cytotoxic chemotherapy, mostly doxorubicin and ifosfamide.

Results: Overall survival

- A total of 154 patients residing in Baden-Württemberg, with a median follow-up of 54.7 months, were included in the OS analysis.

Fig. 2: Multivariate Cox regression analysis for overall survival

- A multivariate Cox regression analysis revealed that tumor grade and histological subtype (monophasic vs. biphasic) did not significantly impact survival.
- Prognostic factors:
  - Age: Patients older than 45 years had a significantly higher risk of death (HR 31.8, 95% CI: 6.6-154.3).
  - Metastatic stage: Patients with metastatic disease had a significantly higher risk (HR 54.8, 95% CI: 8.2-366.7).

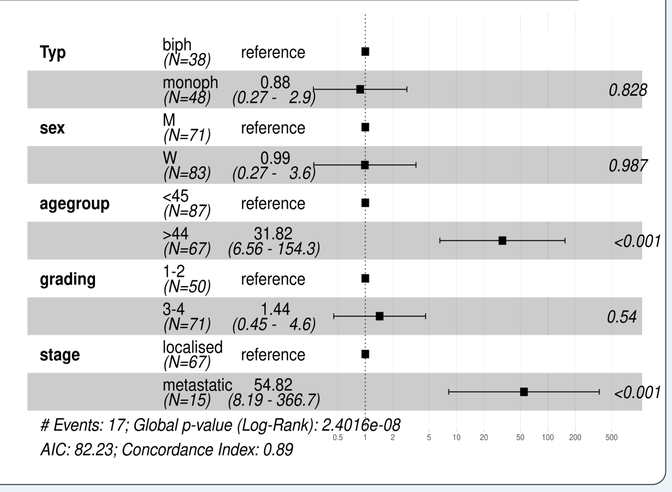


Fig.3. Univariate Analysis: Impact of grading

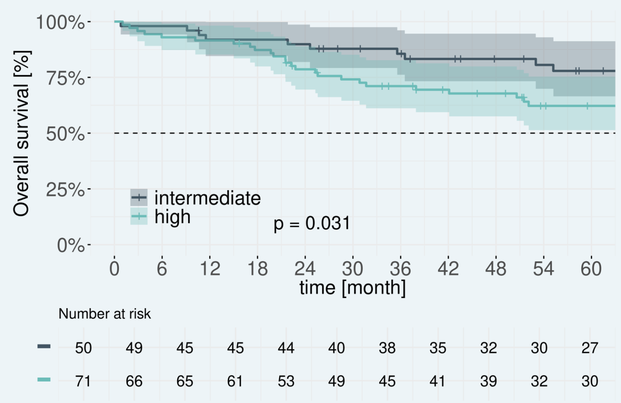
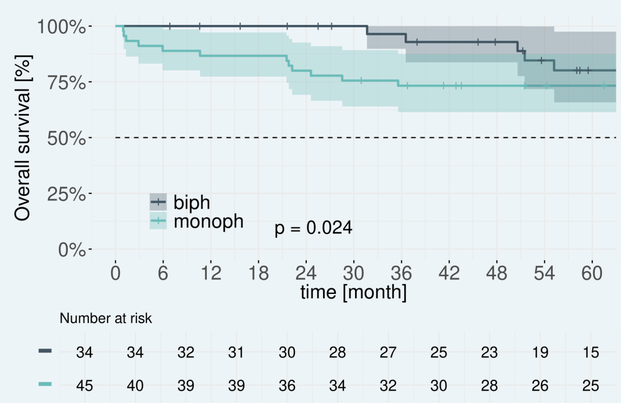


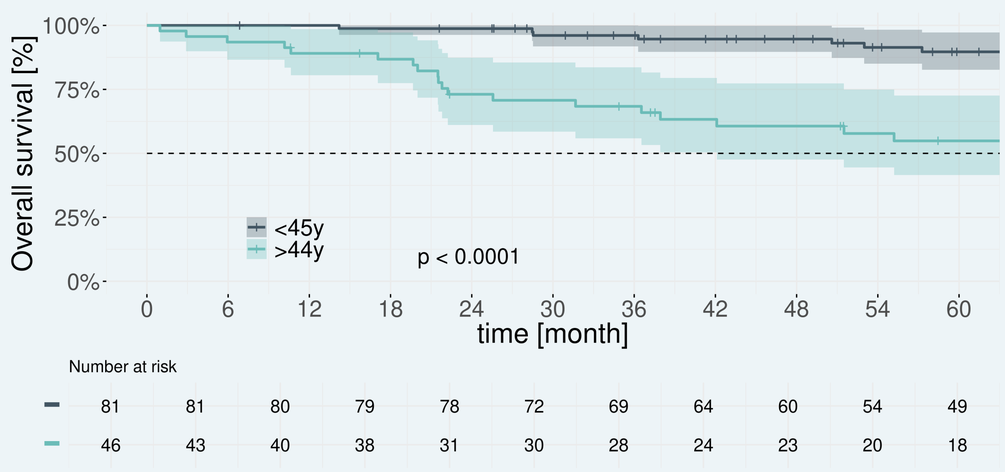
Fig.4. Impact of histological type



Univariate OS-Subgroup Analysis:

- The hazard ratio (HR) for patients with high grade tumors was 2.1 (95% CI 1.1–4.2) compared to those with intermediate grade.
- OS for localized SS was worse for monophasic compared to biphasic histology, with a 36-month OS of 73% vs 96%, respectively (p = 0.024).

Fig.5. Impact of age



- Patients older than 44 years had significantly worse median overall survival (OS) of 55.2 months compared to younger patients (p < 0.0001).

Discussion and Conclusion

- This study is one of the largest retrospective analyses of SS to date, providing valuable insights into the disease's clinical characteristics and survival outcomes.
- Our findings emphasize the prognostic importance of key factors, including age, tumor grade, and histological subtype:
  - Older age is associated with significantly poorer survival outcomes.
  - Higher tumor grade correlates with worse prognosis.
  - Monophasic histology is linked to reduced survival compared to biphasic histology.
- The survival differences observed with age cannot be fully explained by age-related factors alone, suggesting that tumor biology may have a more substantial impact on patient outcomes.
- Given these findings, further investigation into molecular markers and the underlying biology of SS is critical for improving prognostic models and treatment strategies.

Conflict of interest : No conflict of interest

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