

# 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)    |

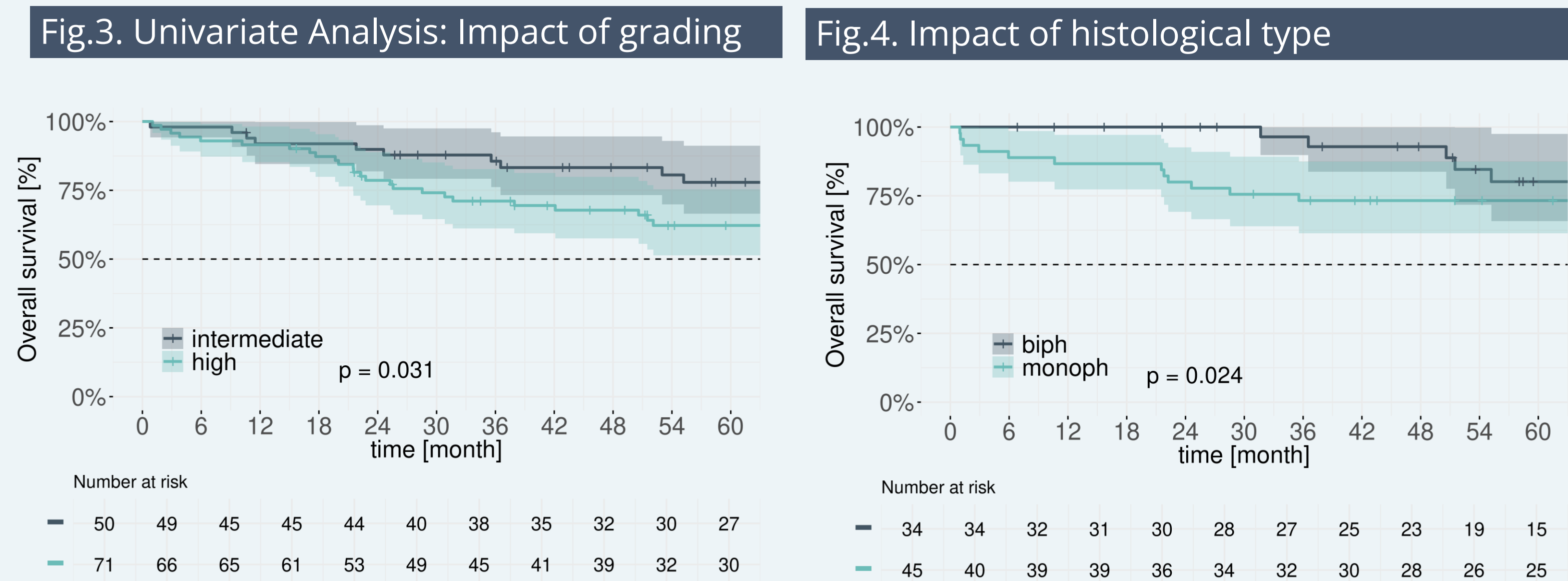
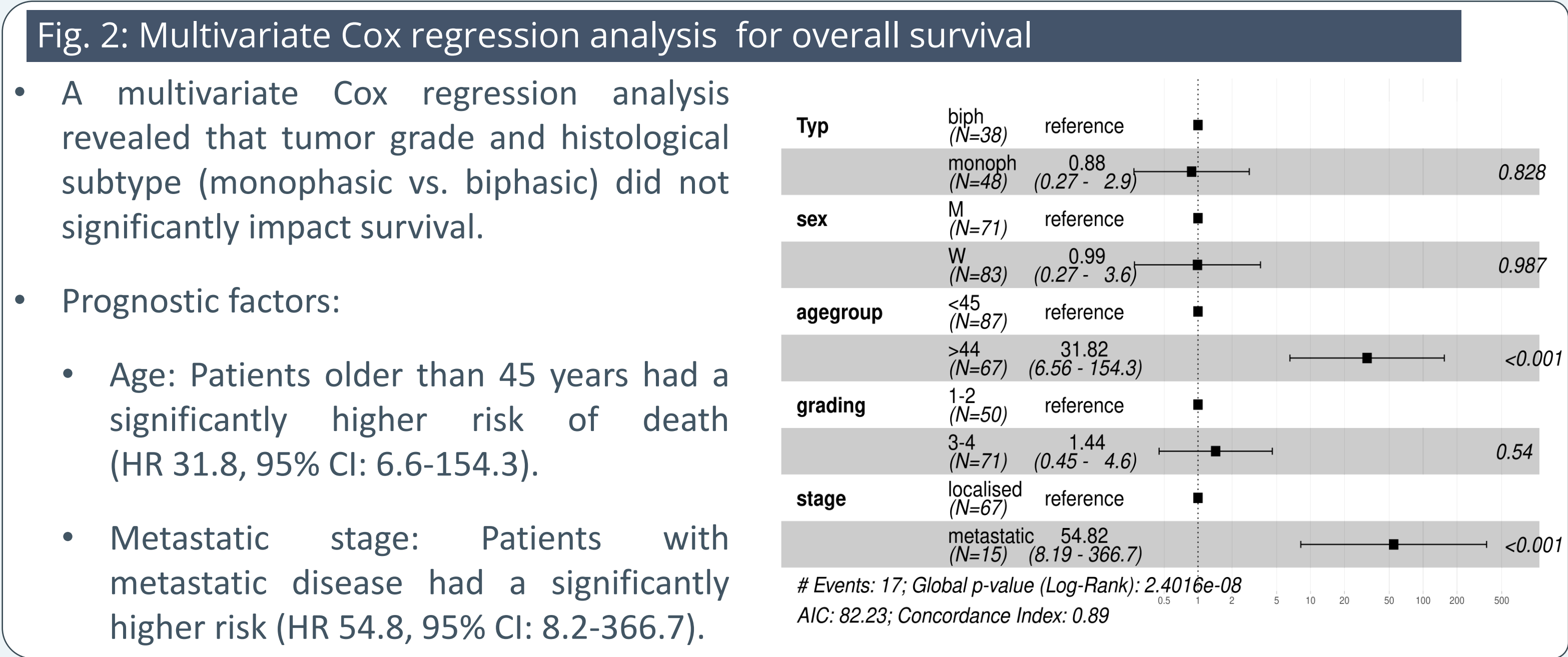
Tab 1: Baseline clinical and patient characteristics

## Therapy

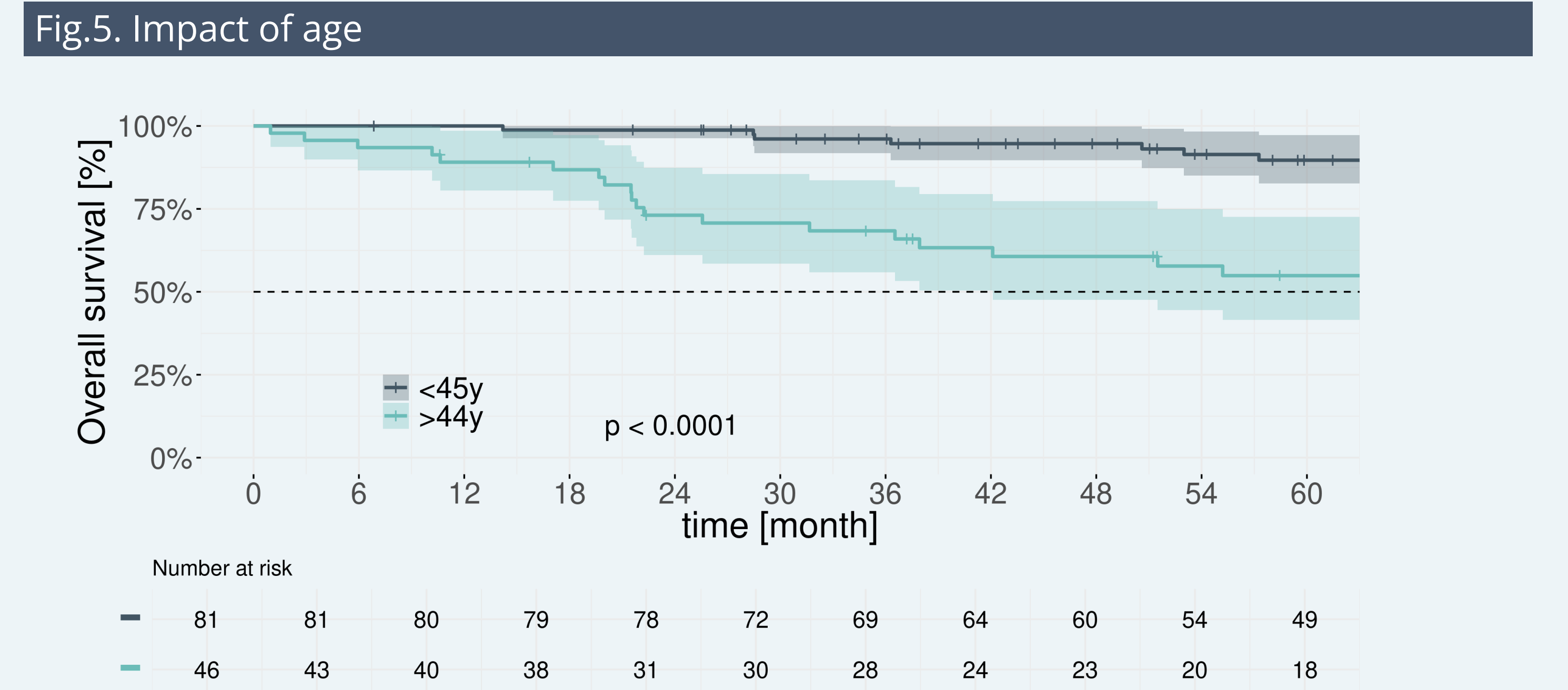
- The primary treatment modality was surgery (82% with R0-resection)
- 61% of patients receiving radiation in either the neoadjuvant or adjuvant setting.
- In advanced stages, systemic therapy predominantly consisted of cytotoxic chemotherapy, mostly doxorubicin and ifosfamide.

## 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.



- 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).



- 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