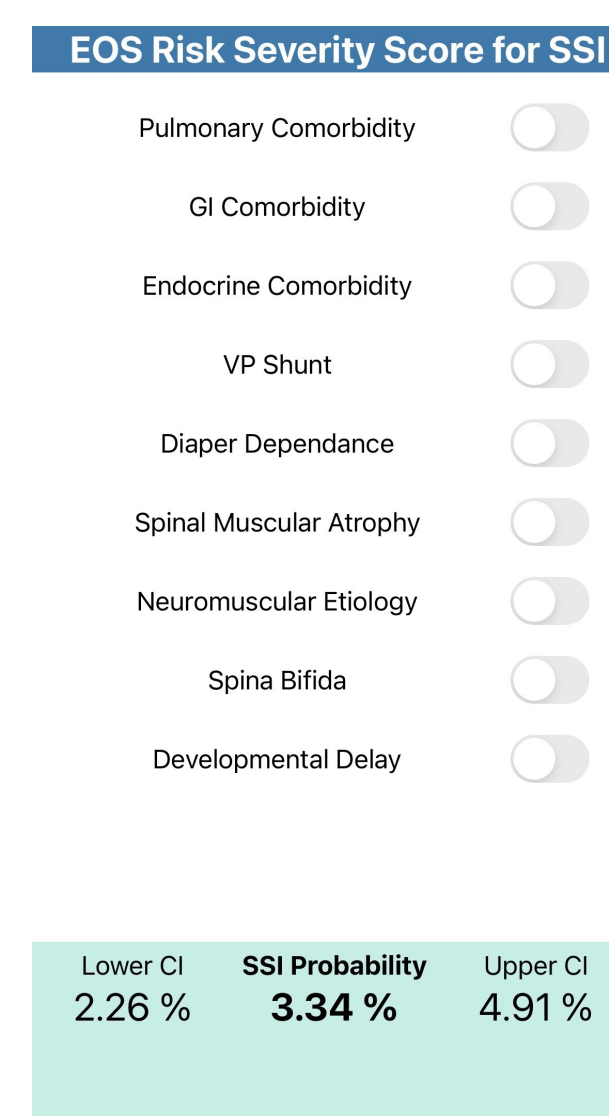


Risk Severity Score (RSS) for Surgical Site Infection (SSI) is associated with Length of Hospital Stay in Growth Friendly Index Surgeries for Early Onset Scoliosis (EOS)

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1 Background and Research Gap

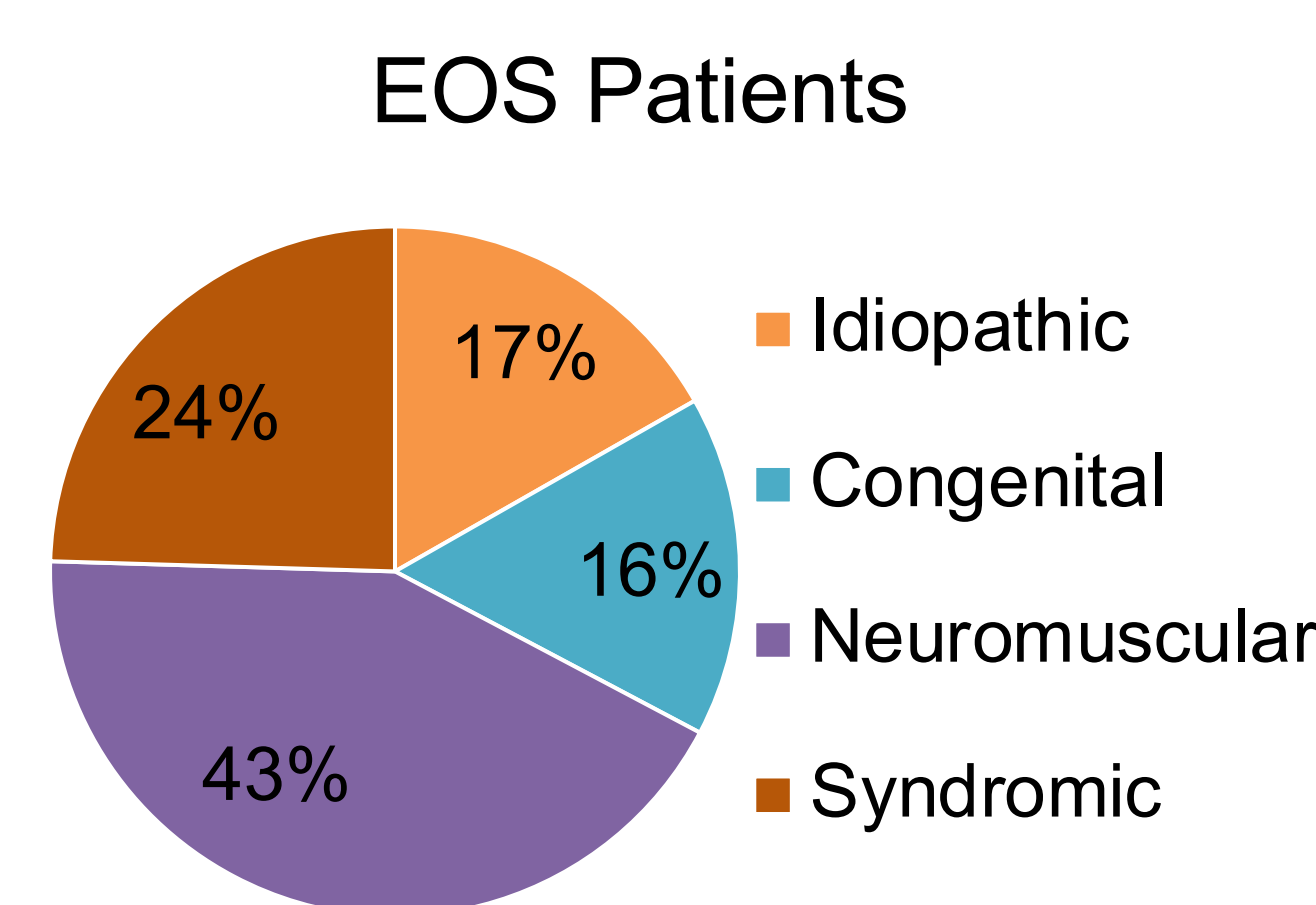
- Surgical site infection (SSI) rates range from 1% to 11% [1] – [3]
- Can lead to lengthy hospital stays and multiple re-operations
- Burden on patients, families, and hospitals
- Matsumoto et al. developed a risk calculator that produces a risk severity score (RSS) intended to predict the probability of SSI in patients with early onset scoliosis (EOS) [4]



Conducted threshold analysis using different RSS and Hospital stay cut-offs

- Patients with an RSS score $\geq 15\%$ had a 71.40% chance of a hospital stay ≥ 4 days ($p=0.028$).
- Patients with an RSS score $\geq 30\%$ had a 62.5% chance of a hospital stay ≥ 6 days ($p=0.016$).
- Patients with an RSS score $\geq 35\%$ had an 80% chance of a hospital stay ≥ 5 days ($p=0.053$).

863 patients with ICU LOS data



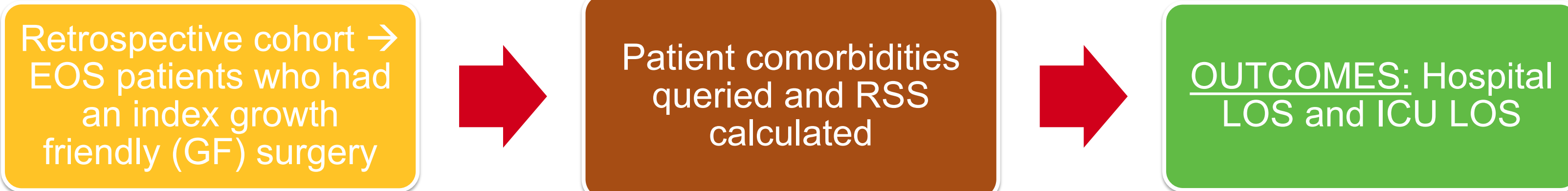
Pearson's correlation showed a weak positive relationship between RSS and ICU LOS ($r=0.165$, $p<0.001$). Spearman's correlation showed a moderate positive relationship between RSS score and hospital LOS ($\rho=0.204$, $p<0.001$)

- Spearman's correlation showed a statistically significant relationship between RSS score and ICU LOS for non-idiopathic scoliosis patients ($\rho=0.156$, $p<0.156$).
- Only Neuromuscular scoliosis patients had a statistically significant correlation between RSS and ICU LOS per Spearman's correlation ($\rho=0.125$, $p=0.045$)

2 Study Purpose

- Our study analyzes whether a higher RSS for SSI is associated with a longer hospital and/or ICU LOS for patients with EOS.

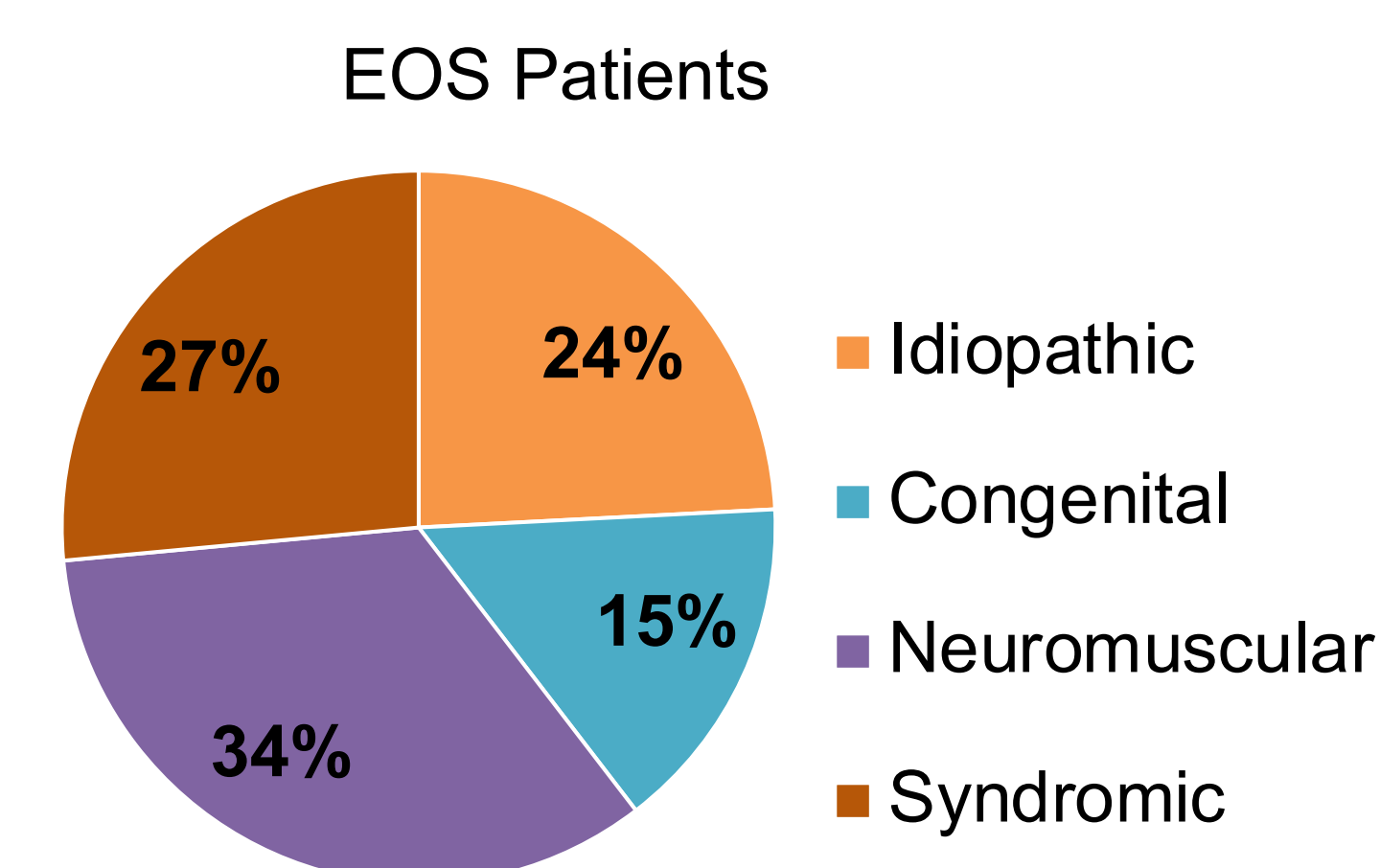
3 Study Design



4 Results

1,300 EOS patients with Hospital LOS data

Pearson's and Spearman's correlation showed a weak positive relationship between RSS and hospital LOS ($r=0.150$, $p<0.001$; $\rho=0.0.219$, $p<0.001$)



- Pearson's, and Spearman's correlations both showed statistically significant but weak correlations between RSS and hospital LOS ($r=0.090$, $p=0.005$; $\rho=0.099$, $p=0.002$) for non-idiopathic scoliosis patients.

- There was a statistically significant correlation between RSS and hospital LOS for patients initially implanted with an MCGR ($r=0.193$, $p<0.001$; $\rho=0.254$, $p<0.001$).

- Spearman's correlation showed a statistically significant relationship between RSS and hospital LOS for patients implanted with a VEPTR/TR, ($\rho=0.112$, $p<0.019$).

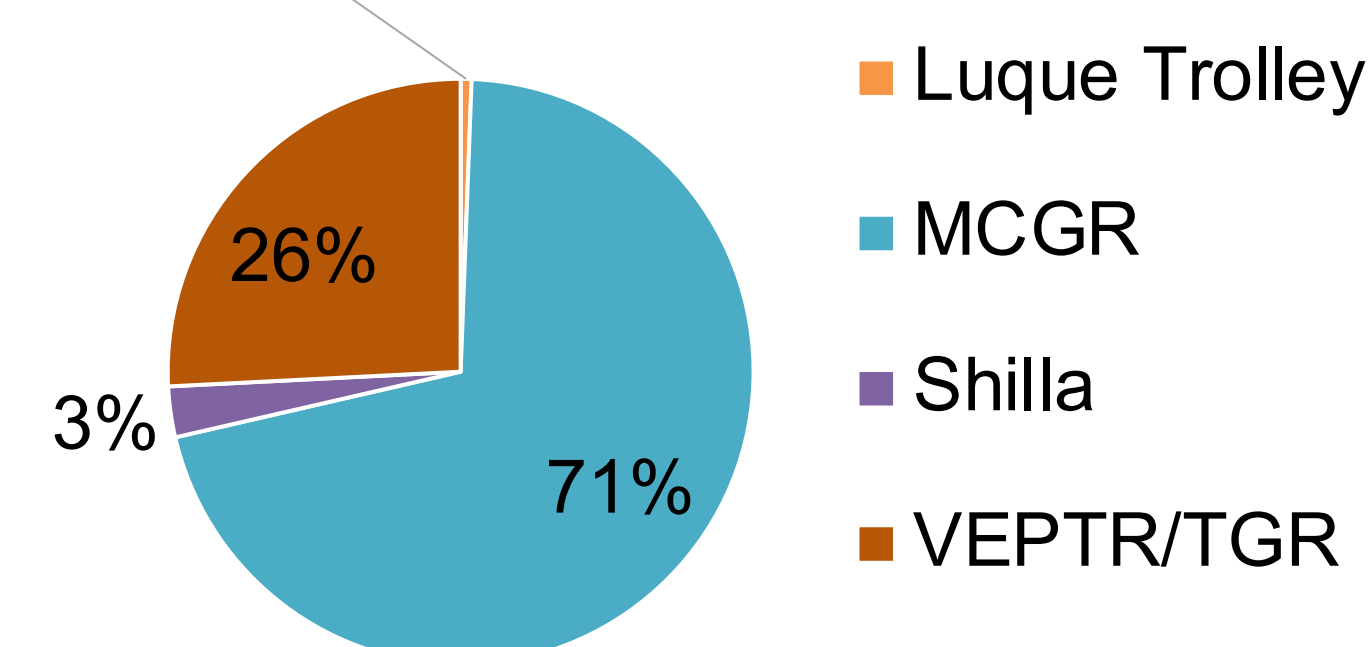
- For patients that had an initial Shilla implant, Spearman's showed a statistically significant relationship between RSS and hospital LOS ($\rho=0.636$, $p<0.001$).

- For patients initially implanted with Luque Trolley, Pearson's showed a statistically significant correlation between RSS and hospital LOS ($r=0.917$, $p<0.028$).

Predicting Hospital LOS from RSS using logistic regression

- Logistic regression showed that the RSS score significantly impacts length of stay ($p=0.002$).
- Every unit of increase in RSS score shows a 4.3% chance of achieving extended length of stay.
- The gender and age of the patient did not significantly impact the length of stay.

Growth Friendly Interventions



- There was a statistically significant relationship between RSS and ICU LOS for patients implanted with an MCGR ($r=0.146$, $p=0.004$; $\rho=0.240$, $p<0.001$).
- Spearman's correlation showed a statistically significant association between RSS and ICU LOS for patients implanted with VEPTR ($\rho=0.181$, $p<0.033$) and Shilla ($\rho=0.266$, $p=0.258$).

Predicting ICU LOS from RSS using logistic regression

- RSS score significantly impacts ICU length of stay ($p=0.001$) by a factor of 1.270. For every unit of increase in the RSS score, there is a 27% chance of having an extended length of stay at the ICU.

Conducted threshold analysis using different RSS and ICU stay cut-offs

- RSS $\geq 25\%$ was associated with a 92.90% chance of an ICU stay ≥ 1 day ($p=0.044$).

5 Conclusion

- RSS is positively correlated with hospital and Hospital and ICU LOS.
- An RSS $\geq 15\%$ serves as a cut-off for increased risk of prolonged hospital stay.
- RSS $\geq 25\%$ serves as a cut-off to predict an ICU stay of at least 1 day.
- These results help to further validate the RSS as a measure of patient fragility.

6 References

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