Rapamycin: A New Frontier In Age-Related Disease Management And Its Future In Formulary

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Background

Rapamycin, an mTOR inhibitor, is being studied for its anti-aging potential, as it may promote healthy aging and reduce chronic diseases by modulating cellular growth, autophagy, and stress resistance.

Objectives

Focuses on the PEARL trial, examining rapamycin's impact on longevity and the economic implications of its use for age-related and chronic diseases within healthcare formularies.

Methodology

A review of the PEARL trial, an ongoing clinical trial focused on rapamycin for longevity assessed aging biomarkers, safety, and body composition.

The data here is primarily focused on the following aspect of the study:

- **Overall safety** and **body composition** changes through tissue and density change

Economic analysis is based on data from private clinics and compared rapamycin longevity treatment's annual cost to that of managing osteoporosis, Type 2 diabetes, inflammatory diseases, and obesity-related conditions.

Figure 1: Rapamycin Longevity Use vs Cost of Targeted Conditions

Condition	Cost Range (USD)
Rapamycin (Longevity Clinics)	$100-$1,000/dose
Osteoporosis (Annual)	$5,000-$15,000/year
Obesity-Related Conditions (Annual)	$1,500-$15,000/year
Type 2 Diabetes (Annual)	$9,600-$14,000/year
Inflammatory Disease (Annual)	$10,000-$20,000/year

Results: **Of the 115 participants, 40 received 5 mg/week of rapamycin, 35 received 10 mg/week, and 39 received a placebo. Non-serious side effects were reported in similar numbers across all groups by both men and women. Lean tissue mass and self-reported pain improved significantly for women using 10mg rapamycin. Trends of improvement in bone mineral density were observed in males using 10mg rapamycin.**

Figure 2: Rapamycin Adverse Events Categories

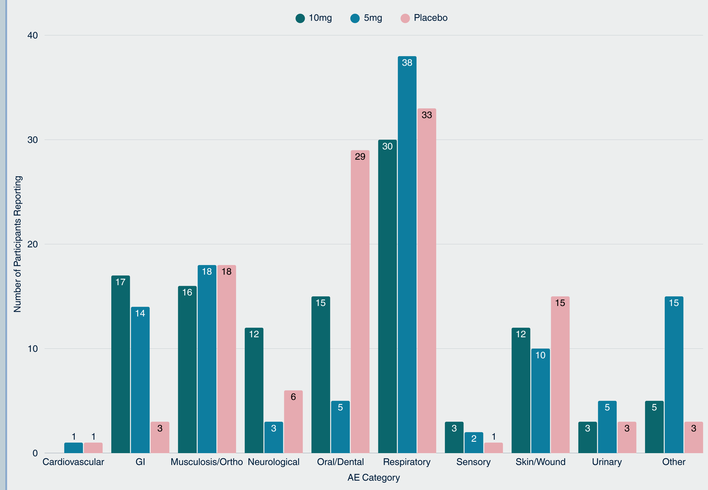


Figure 3: Rapamycin Adverse Events by Gender and Treatment Type

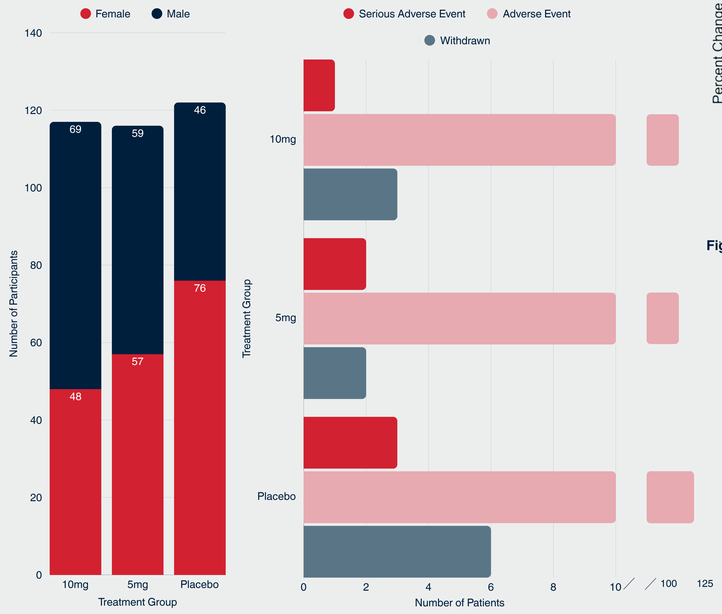


Figure 4: Changes in Lean Tissue Mass[1]

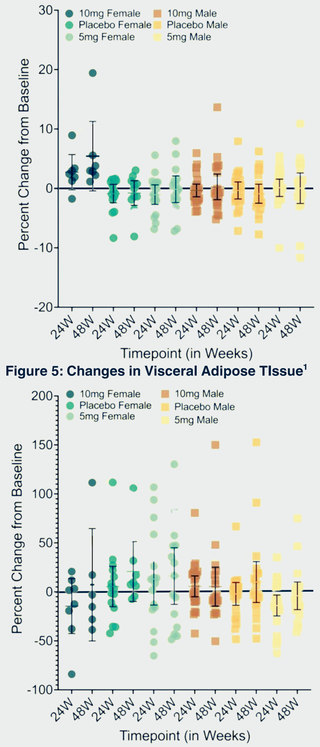


Figure 5: Changes in Visceral Adipose TIssue[1]

Figure 6: Changes in Bone Mineral Density[1]

Figure 1

- This table shows the estimated annual costs of managing chronic conditions.
- The healthcare burden of oral rapamycin is less than that of the conditions it can potentially regulate.

Figure 2

- Participants experienced similar types of non-serious adverse events regardless of group, with the notable exception of both the 5mg and 10mg rapamycin patients experiencing higher rates of Gastrointestinal events.
- 10mg rapamycin patients also experienced slightly higher incidences of Neurological and Oral/Dental events when compared to the 5mg group.

Figure 3

- Participants across all groups reported a similar number of incidences of adverse events, with the highest rates of serious adverse events in placebo users (a).
- Adverse event numbers were similar by gender for all groups (b), and in total number of participants experiencing adverse events in each group (c).

Figure 4

- Males taking 5mg of rapamycin had significantly reduced visceral fat compared to the 10mg group at 24 weeks, but this effect disappeared by 48 weeks and was not significant compared to placebo.

Figure 5

- Males showed significant difference in visceral adipose tissue at 24 weeks with improvements in 5mg relative to 10mg but not in the placebo test group.

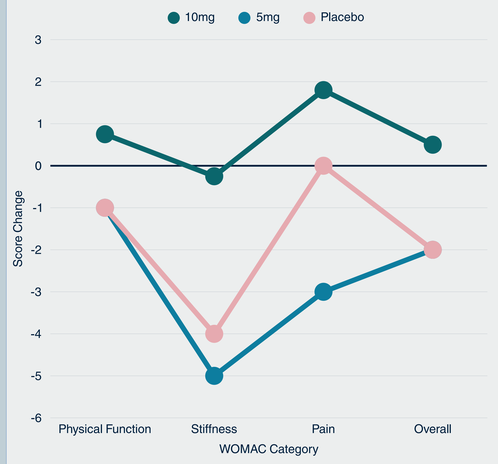
Figure 6

- Individual responses for measures of bone mineral density change span a range of values for each dose and gender.
- Trending differences were observed for males after a 48 week mark; specifically for improvements in the 10mg versus 5mg test group.

Figure 7

- After 48 weeks of treatment, the WOMAC scoring analyzing frailty showed improvement, specifically amongst participants in the low-dose 5mg test group.

Figure 7: WOMAC Score Change



Conclusion

- The ongoing PEARL trial shows low-dose rapamycin is well tolerated and improves key aging outcomes, supporting safe off-label use.
- With an annual cost of approximately $6,600, it offers a cost-effective alternative to managing costly age-related diseases.

References

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