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Efficacy of Coenzyme Q10 Supplementation on Follicular Dynamics and Clinical Pregnancy Rates in Patients with Primary Infertility: A Controlled Interventional Study

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Abstract: Background: Oocyte quality is often compromised by mitochondrial insufficiency and oxidative stress. Coenzyme Q10 (CoQ10) serves as a vital electron carrier in the mitochondrial respiratory chain, potentially reversing age-related and oxidative decline in reproductive cells. Methods: A prospective comparative interventional study was executed at ABVIMS and Dr. RML Hospital, New Delhi (April 2023–March 2024). Forty participants with primary infertility were bifurcated into an intervention group (n=20), receiving 600 mg of CoQ10 daily for 90 days, and a control group (n=20). Results: The CoQ10 cohort exhibited statistically significant improvements in ovulation regularity and higher cumulative conception rates compared to the control group. Conclusion: Supplemental CoQ10 may serve as a potent adjunct therapy for enhancing oocyte competence and pregnancy outcomes.

1. Introduction

Infertility remains a global reproductive challenge, frequently rooted in suboptimal oocyte quality. Emerging evidence suggests that the decay of mitochondrial function—the "powerhouse" of the cell—is a primary driver of reproductive aging and failure. Coenzyme Q10 (ubiquinone) is an endogenous antioxidant essential for cellular energy production [1].By neutralizing reactive oxygen species (ROS), CoQ10 may preserve the integrity of the meiotic spindle and genomic stability in developing follicles. This study evaluates the clinical utility of high-dose CoQ10 in improving conception rates within a primary infertility population.[2]

2. Materials and Methods

• Study Setting: The research was conducted at the Infertility clinic,Department of Obstetrics and Gynaecology, ABVIMS and Dr. RML Hospital, New Delhi.

• Participants: Forty women diagnosed with primary infertility were recruited via convenience sampling.
• Intervention: The case group received a daily oral dose of 600 mg CoQ10 for a duration of three months.
• Outcome Measures: Primary outcomes included the confirmation of ovulation via serial ultrasonography and the achievement of clinical pregnancy.
• Statistical Analysis: Quantitative data were analyzed using Chi-square tests for categorical variables and t-tests for continuous data, with significance set at .

3. Results

The following data represents the comparative outcomes between the two study arms after the 3-month intervention period.

Table 1: Comparison of Reproductive Outcomes

Outcome Parameter	CoQ10 Group (n=20)	Control Group (n=20)	P-value
Ovulation Rate (%)	85%	60%	<0.05
Conception Rate (%)	30%	15%	<0.05
Follicular Maturity (mm)	19.2 ±Â1.5	17.1 ±Â1.8	<0.05

4. Discussion

Our findings indicate that a 600 mg daily regimen of CoQ10 significantly bolsters the physiological markers of fertility. This aligns with the "Mitochondrial Theory of Oocyte Aging," which posits that exogenous ubiquinone can restore ATP production within the oocyte, thereby facilitating successful fertilization and early embryonic cleavage. [4,5] While our sample size was limited, the trend suggests that CoQ10 acts as a protective shield against the oxidative stress typically found in the follicular fluid of infertile women. [6,7]

5. Conclusion

Coenzyme Q10 supplementation represents a safe, non-invasive strategy to improve oocyte quality and pregnancy success in primary infertility. We recommend multi-centric trials with larger cohorts to establish standardized dosage guidelines.

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