Hubungan Kadar Zinc dan Kalsium dalam Serum dan Cairan Folikel dengan Ekspresi mRNA GDF9 terhadap Maturasi Oosit = Association Between Serum and Follicular Levels of Zinc and Calcium and GDF9 mRNA Expression Towards Maturation of Oocytes

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Abstrak

Latar belakang: Suplementasi mikronutrien untuk wanita pada masa prakonsepsi, khususnya zinc dan kalsium, terbukti penting untuk maturasi oosit dan ovulasi. Namun, peran zinc dalam mempromosikan kualitas oosit dan potensi perkembangannya belum diketahui secara jelas. GDF9, anggota superfamili TGF b yang disekresikan dari oosit selama proses folikulogenesis, terbukti dapat menjadi biomarker maturasi nuklear oosit dan kualitas embrio. Tujuan: Studi potong lintang ini bertujuan untuk mengetahui apakah ada hubungan antara kadar zinc dan kalsium dalam serum dan cairan folikel dengan ekspresi GDF9 terhadap maturasi oosit. Selain itu, penelitian ini juga bertujuan untuk mengetahui apakah kadar zinc dan kalsium dalam serum dapat mewakili kadar zinc dan kalsium dalam cairan folikel. Metode: Studi ini dilakukan pada 25 subjek penelitian yang menjalani program fertilisasi in vitro di Poliklinik Yasmin RSUPN Cipto Mangunkusumo (RSCM) Kencana. Darah vena sebanyak 6 cc diambil pada hari ovum pick up (OPU) dan kemudian dianalisis di laboratorium untuk mengetahui kadar zinc, kalsium, dan protein GDF9. Cairan intrafolikuler dan sel granulosa juga akan diambil dan diperiksa kadar zinc dan kalsium dari cairan intrafolikuler serta ekspresi mRNA GDF9 dari sel granulosa. Hasil: Dari 25 subjek penelitian, 12 subjek (48%) di antaranya dikategorikan ke dalam kelompok angka maturasi oosit baik (berdasarkan indikator oosit matur dari konsensus Vienna) serta 13 (52%) sisanya dikategorikan ke dalam kelompok angka maturasi oosit buruk. Dari uji korelasi antara kadar zinc dan kalsium dalam serum dengan cairan folikel, kadar zinc folikel terbukti berkorelasi secara signifikan dengan kadar zinc serum (p = 0,019). Kadar GDF9 serum juga terbukti berkorelasi secara signifikan dengan ekspresi GDF9 (p = 0,047). Tidak didapatkan korelasi yang bermakna antara kadar zinc dan kalsium serum dengan kadar GDF9 serum serta ekspresi mRNA GDF9 dari sel granulosa terhadap angka maturasi oosit (p > 0,05). Kesimpulan: Kadar GDF9 serum dapat menjadi pengganti biomarker untuk kualitas oosit. Tidak didapatkan hubungan antara kadar zinc dan kalsium dalam serum atau cairan folikel terhadap kadar GDF9 serum atau ekspresi mRNA GDF9 dari sel granulosa terhadap angka maturasi oosit. <hr /> Background: Micronutrient supplementation for women during preconception, especially zinc and calcium, is critical for oocyte maturation and ovulation. However, the role of Zinc in promoting quality of oocytes has not yet been elucidated. GDF9, one of oocyte sereting factor, has been proven to be a biomarker of maturation of nuclear oocyte and quality of embryo. Aim: to investigate any relationship between zinc and calcium levels in serum and follicular fluid and GDF9 expression towards maturation of oocytes. In addition, this study also aimed to determine whether zinc and calcium levels in serum could represent zinc and calcium levels in follicular fluid. Method: This cross-sectional study was conducted on 25 subjects who underwent IVF programs at the Yasmin Policlinic, RSCM Kencana. Six mililiters of venous blood was taken on the day of the ovum pick up (OPU) and then analyzed in the laboratory to

determine the levels of zinc, calcium, and protein GDF9. In addition to venous blood, intrafollicular fluid and granulosa cells will also be taken and examined zinc and calcium levels from intrafollicular fluid and GDF9 mRNA expression from granulosa cells. Result: 12 (48%) out of 25 subjects were categorized into high oocyte maturation rate (based on Vienna consensus on oocyte maturation rate), and the other 13 (52%) were categorized into low oocyte maturation rate. Follicular zinc levels were significantly correlated with serum zinc levels (p = 0,019). Serum GDF9 levels were also significantly correlated with expressions of GDF9 mRNA (p = 0,047). No significant correlation was found between serum levels of zinc and calcium and serum GDF9 levels or GDF9 mRNA expression towards maturation of oocytes (p > 0,05). Conclusion: Serum GDF9 might substitute for follicular GDF9 as a biomarker of oocyte quality. There is no relationship between serum or follicular zinc/calcium levels and serum GDF9 levels or GDF9 mRNA expression from granulosa cells towards oocyte maturation rates.