Pengaruh Pemberian Vitamin C, Asam Lipoat, dan Pentoksifilin terhadap Spermatozoa Pasca Kriopreservasi: Kajian terhadap Kualitas, Kadar ROS, Indeks Fragmentasi DNA, dan Apoptosis = Effect of Vitamin C, Alpha Lipoic Acid and Pentoxifylline on Sperm Condition Post Cryopreservation: Analysis on Quality, ROS Level, DNA Fragmentation Index, and Apoptosis

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Abstrak

Kriopreservasi adalah salah satu prosedur yang termasuk ke dalam serangkaian TRB. Prosedur ini telah secara rutin diaplikasikan untuk penggunaan spermatozoa di masa depan. Namun, pada praktiknya, spermatozoa yang dikriopreservasi akan mengalami penurunan kualitas terutama pada kemampuan motilitasnya, hingga menyebabkan kematian spermatozoa. Penurunan pada parameter spermatozoa pasca thawing diyakini paling utama disebabkan karena produksi berlebih dari ROS akibat kejutan suhu dan osmotik selama proses pembekuan dan pencairan. Pada penelitian ini, dilakukan suplementasi antioksidan dengan vitamin C, ALA, dan pentoksifilin pada medium kriopreservasi untuk dianalisis pasca thawing terhadap beberapa parameter di antaranya kualitas spermatozoa, kadar MDA, Indeks Fragmentasi DNA (IFD), dan apoptosis spermatozoa melalui ekspresi caspase-3 pada subyek normozoospermia dan non-normozoospermia. Hasil menunjukkan secara umum antioksidan vitamin C, ALA, dan pentoksifilin cenderung meningkatkan kualitas spermatozoa pasca thawing dengan meningkatkan motilitas, cryosurvival dan viability rate. Secara signifikan, peningkatan kualitas spermatozoa pasca thawing ditunjukkan oleh pentoksifilin dengan meningkatkan motilitas pasca thawing dan cryosurvival rate. Ketiga antioksidan cenderung menurunkan konsentrasi MDA dan apoptosis, namun hanya vitamin C yang menurunkan IFD.
.....Cryopreservation is one of the procedures included in a series of TRB procedures. This procedure has been routinely applied for future use of spermatozoa. However, practically, cryopreserved spermatozoa will experience a decrease in quality, particularly in their motility ability, which in turn causing cell death. The decrease in post-thawing spermatozoa parameters is believed to be mainly due to the overproduction of ROS due to temperature and osmotic shock during freezing and thawing. In this study, antioxidant supplementation with vitamin C, ALA, and pentoxifylline was supplemented in cryopreservation medium and carried out for post-thawing analysis of several parameters including spermatozoa quality, MDA levels, DNA Fragmentation Index (DFI), and apoptosis through the activation of caspase-3 expression in normozoospermic and non-normozoospermic subject. The results showed that in general, the antioxidants included vitamin C, ALA, and pentoxifylline improved the quality of post-thawing spermatozoa by increasing motility, cryosurvival, and viability rate. The quality of spermatozoa post-thawing was significantly improved by pentoxifylline, which significantly improved motility and cryosurvival rate. The antioxidants reduced the concentration of MDA and apoptosis insignificantly, yet only vitamin C decreased the DFI.