UNIVERZITET U SARAJEVU - VETERINARSKI FAKULTET

Patofiziološki aspekti kognitivne disfunkcije pasa i mačaka

Završni rad

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Sarajevo, septembar 2025

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Pathophysiological aspects of cognitive dysfunction in dogs and cats

Diploma Thesis

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SAŽETAK

Zahvaljujući razvoju veterinarske medicine, boljoj prehrani i promjenama načina držanja, značajan broj pasa i mačaka danas doživljava duboku starost. Produženje životnog vijeka dovelo je do češće pojave bolesti povezanih sa starenjem, među kojima su najvažniji neurodegenerativni poremećaji, i to sindrom kognitivne disfunkcije, koji je sličan Alzheimerovoj bolesti kod ljudi. Sindrom kognitivne disfunkcije se manifestuje postepenim smanjenjem kognitivnih funkcija, najčešće kroz promjene u ponašanju, pamćenju, orijentaciji, svakodnevnim navikama i poremećaje ciklusa spavanja-budnosti. Epidemiološke studije pokazuju da broj oboljelih pasa raste sa starošću životinje, tako čak dvije trećine pasa starijih od devet godina pokazuje kliničke znakove kognitivne disfunkcije, dok se kod mačaka rizik od kognitivnog pada udvostručuje nakon petnaeste godine života. Patofiziološku osnovu sindroma kognitivne disfunkcije čini nakupljanje beta-amiloidnih depozita u mozgu, poremećaj sinaptičke transmisije, hronična aktivacija glijalnih ćelija, hiperfosforilacija tau proteina, oksidativni stres i metaboličke promjene. Sve ove promjene dovode do narušene funkcije nervnih ćelija, gubitka neuroplastičnosti i smanjene sposobnosti adaptacije mozga na nove informacije, što rezultira klinički manifestnim kognitivnim padom.

Razvoju i napredovanju bolesti dodatno doprinose endokrini i metabolički poremećaji. Strukturne promjene u mozgu poput atrofije prefrontalnog korteksa, hipokampusa i gubitka neurogeneze mogu se utvrditi naprednim neuroimaging metodama (MRI, VBM analiza) i predstavljaju neizostavan korak u dijagnostici.

Zbog izraženih neuropatoloških i kliničkih sličnosti kognitivne disfunkcije pasa sa Alzheimerovom bolešću ljudi, psi i mačke služe kao važni translacijski modeli za istraživanje neurodegenerativnih bolesti ljudi. Pravovremena dijagnoza ključna je za očuvanje kvaliteta života pasa i mačaka, zbog čega sistemska procjena ponašanja treba postati standard u kliničkom pregledu gerijatrijskih pacijenata.

Ključne riječi: kognitivna disfunkcija, psi, mačke, starenje, neurodegeneracija

SUMMARY

Thanks to advances in veterinary medicine, improved nutrition, and changes in animal husbandry, a significant number of dogs and cats today reach advanced ages. The extension of lifespan has led to a more frequent occurrence of age-related diseases, among which the most important are neurodegenerative disorders, notably cognitive dysfunction syndrome, which is similar to Alzheimer's disease in humans. Cognitive dysfunction syndrome manifests as a gradual decline in cognitive functions, most often through changes in behavior, memory, orientation, daily habits, and disturbances in the sleep-wake cycle. Epidemiological studies show that the number of affected dogs increases with age, with up to two-thirds of dogs older than nine years exhibiting clinical signs of cognitive dysfunction, while in cats the risk of cognitive decline doubles after the age of fifteen.

The pathophysiological basis of cognitive dysfunction syndrome includes the accumulation of beta-amyloid deposits in the brain, impaired synaptic transmission, chronic activation of glial cells, tau protein hyperphosphorylation, oxidative stress, and metabolic alterations. All of these changes lead to impaired neuronal function, loss of neuroplasticity, and a reduced ability of the brain to adapt to new information, resulting in clinically manifest cognitive decline.

The development and progression of the disease are further influenced by endocrine and metabolic disorders. Structural changes in the brain, such as atrophy of the prefrontal cortex, hippocampus, and loss of neurogenesis, can be detected using advanced neuroimaging methods (MRI, VBM analysis) and represent an essential step in diagnostics.

Due to the pronounced neuropathological and clinical similarities between canine cognitive dysfunction and human Alzheimer's disease, dogs and cats serve as important translational models for studying human neurodegenerative diseases. Timely diagnosis is crucial for maintaining the quality of life of dogs and cats, which is why systematic behavioral assessment should become a standard part of clinical examination in geriatric patients

Keywords: cognitive dysfunction, dogs, cats, aging, neurodegeneration