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THE VALUE OF CONE BEAM COMPUTED TOMOGRAPHY ANGIOGRAPHY IN STUDYING THE ARTERIAL SYSTEM IN VICINITY TO GUTTURAL POUCH IN HORSES

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THE VALUE OF CONE BEAM COMPUTED TOMOGRAPHY ANGIOGRAPHY IN STUDYING THE ARTERIAL SYSTEM IN VICINITY TO GUTTURAL POUCH IN HORSES

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DEDICATION

This project paper is dedicated

To my family,

Apak, *Mak*, and my brothers.

And to all my teachers who guiding me in completing this project.

CERTIFICATION

It is hereby certified that we have read this project paper entitled "The Value of Cone Beam Computed Tomography Angiography in Studying the Arterial System in vicinity to Guttural Pouch in Horses", by Haniza binti Jais and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course VPD 4999 – Final Year Project.

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NILAI ANGIOGRAFI TOMOGRAFI BERKOMPUTER BERALUR KON DALAM MEMPELAJARI SISTEM ARTERI BERDEKATAN DENGAN KANTUNG GARAU DI DALAM KUDA

Oleh

Haniza binti Jais

2017

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Kantung garau adalah divertikulum besar tiub Eustachia yang menghubungkan tekak dengan bahagian tengah telinga. Ia adalah struktur yang unik di dalam kuda kerana anatominya terletak berdekatan dengan struktur penting yang lain seperti arteri karotid internal, arteri maksilari, arteri karotid eksternal, saraf glosofaringeal, dan saraf hipoglosal. Struktur ini adalah penting sekiranya berlaku mikosis kantung garau di mana kerosakannya boleh menyebabkan deficit neurologi dan pendarahan teruk yang boleh membawa maut kepada kuda. Oleh itu, satu kajian telah dijalankan untuk menentukan nilai menggunakan angiografi tomografi berkomputer beralur kon dalam mengkaji sistem arteri di sekitar kantung garau. Dua

ekor kuda yang sudah bersara telah dimatikan dengan berperikemanusiaan atas sebab-sebab atau masalah yang tidak berkaitan dengan kantung garau telah digunakan untuk kajian ini. Media kontras yang berasaskan iodin (Iomeprol) telah disuntik melalui arteri karotid sesama untuk menyerlahkan arteri dalam kepala kadaverik. Berdasarkan imej angiografi tomografi berkomputer, arteri-arteri penting di sekitar kantung garau boleh dikenal pasti dan dilihat dalam tiga satah yang berbeza iaitu satah transversal, satah sisi, dan satah dorsal. Walaupun terdapat beberapa batasan dalam menggunakan kaedah ini, kajian tomografi berkomputer di dalam kantung garau serta arteri-arteri yang berdekatan dengannya telah menghasilkan imej laluan anatomi arteri yang sangat baik.

Kata kunci: Kantung garau, angiografi tomografi berkomputer beralur kon, arteri karotid internal, kuda

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD 4999 Final Year Project.

THE VALUE OF CONE BEAM COMPUTED TOMOGRAPHY ANGIOGRAPHY IN STUDYING THE ARTERIAL SYSTEM IN VICINITY TO GUTTURAL POUCH IN HORSES

by

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2017

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Guttural pouches are the large diverticula of the eustachian tubes that connect the pharynx to the middle ear. It is a unique structure in equine as it is anatomically located very closely to other important structures such as internal carotid artery, maxillary artery, external carotid artery, glossopharyngeal nerve, and hypoglossal nerve. These structures are important in the event of guttural pouch mycosis as the damage can cause neurological deficit and severe haemorrhage, which may be fatal to the horse. Hence, a study was conducted to determine the value of using cone beam computed tomography angiography in studying the arterial system in vicinity

to the guttural pouch. Two retired horses were euthanized humanely for reasons or problems unrelated to the guttural pouches were used for this study. Iodine based contrast media (Iomeprol) was injected via common carotid arteries to highlight the arteries of the cadaveric heads. Based on the computed tomography angiography images, the important arteries in vicinity to the guttural pouch can be recognized and observedin three different plane, which are the transverse plane, the sagittal plane, and the dorsal plane. Even though there are several limitations in using this method, computed tomography study of the guttural pouch and the important arteries provided excellent imaging of the anatomical pathways of the associated arteries in relation to the pouch.

Keywords: *Guttural pouch, cone beam computed tomography angiography, internal carotid artery, horses.*

CHAPTER 1

INTRODUCTION

Guttural pouches are large diverticula of the eustachian tubes that connect the pharynx to the middle ear (Hardy and Le´veille, 2003). The exact function of the guttural pouches in horses remains unclear but Baptiste (1998) has provided evidence that the guttural pouches of horse may function as brain cooling system by allowing air from the nasopharynx goes into and ventilate the guttural pouches to reduce the temperature of blood flowing within the internal carotid arteries (ICA). Guttural pouch of a horse can be related to a mycotic or fungal disease, known as guttural pouch mycosis. It can cause fatal haemorrhage, whereby the fungal erodes the wall of the guttural pouch and subsequently the wall of the internal carotid artery (Cook, 1968), as well as wall of the external carotid artery and the maxillary artery (Markus *et al.,* 2005). The invasion of the mycotic lesion at specific anatomical region of the guttural pouch is still unclear (Lepage *et al.,* 2004).In relation to guttural pouch mycosis, a computed tomography angiography of the guttural pouch and the arterial system in vicinity to it could shed some lights in terms of passage of fungal infection into the guttural pouch. Thus, the purpose of this study is to determine the value of using cone beam computed tomography angiography in studying the arterial system in vicinity to the guttural pouch in horse.

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