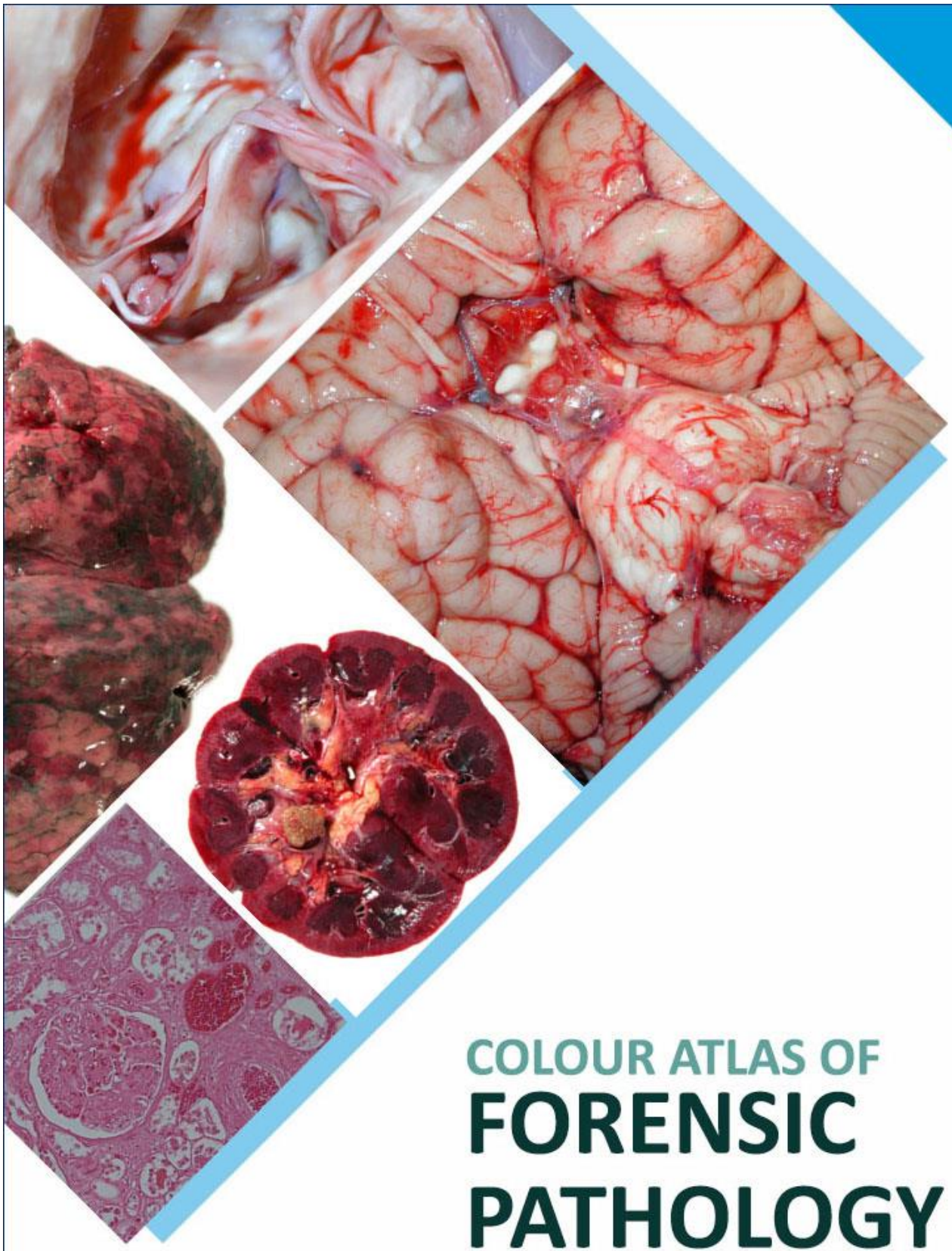

COLOUR ATLAS OF FORENSIC PATHOLOGY

CENTRAL NERVOUS SYSTEM

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Version 1

CENTRAL NERVOUS SYSTEM

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FOREWORD

The greatest pleasure I experience as a teacher, is to see my students excel in their chosen careers and perform even better than myself. The series of e-booklets prepared to better equip medical officers to handle common conditions likely to be encountered in their day to day forensic practice by Professor Dinesh Fernando, is a good example of one of my students doing better than me!

Dinesh is the son of Emeritus Professor of Community Medicine, Former Head, Department of Community Medicine, Former Dean, Faculty of Medicine and Vice Chancellor of the University of Peradeniya, Malcolm Fernando, who was an illustrious medical academic. Following his father's footsteps, he joined the University of Peradeniya in 2003.

Dinesh was one of my post graduate trainees at the Department of Forensic Medicine and Toxicology, Faculty of Medicine, Colombo, and obtained the doctorate in Forensic Medicine in 2003. He underwent post-doctoral training at the Victorian Institute of Forensic Medicine, Melbourne, Australia, with my colleague and contemporary at Guy's Hospital Medical School, University of London, Professor Stephen Cordner. During this period, he served as the honorary forensic pathologist of the Disaster Victim Identification team in Phuket, Thailand following the tsunami, and was awarded an operations medal by the Australian Federal Police.

He has edited, and contributed chapters to, 'Lecture Notes in Forensic Medicine' authored by the former Chief Judicial Medical Officer, Colombo, Dr. L.B.L. de Alwis and contributed to 'Notes on Forensic Medicine and Medical Law' by Dr. Hemamal Jayawardena. He is the editor of the Sri Lanka Journal of Forensic Medicine, Science and Law. Continuing his writing capabilities, he has compiled an important and unique set of e-booklets which will be a great asset to undergraduate and post-graduate students of Forensic Medicine, and also to our colleagues. Its succinct descriptions of complicated medico-legal issues and clear and educational photographs are excellent. It makes it easy for the students to assimilate the theoretical knowledge of each topic as they have been augmented with histories, examination findings, macroscopic and microscopic photographs of actual cases. In some areas, photographs from multiple cases have been included, so that the students can better appreciate the subtle differences that would be encountered in their practice.

I sincerely thank my ever so grateful student Dinesh, for giving me this great honour and privilege to write the foreword.

Professor Ravindra Fernando

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FRCP (Glasgow), FRCP (Edinburgh), FRCPath. (UK)

Senior Professor of Forensic Medicine, General Sir John Kotelawala Defence University, Ratmalana.
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About the authors.....

Dr. Dinesh Fernando is a merit Professor in Forensic Medicine at the Faculty of Medicine, University of Peradeniya and honorary Judicial Medical Officer, Teaching Hospital Peradeniya. He obtained his MBBS in 1994 with Second class honours from the North Colombo Medical College, Sri Lanka, and was board certified as a specialist in Forensic Medicine in 2004. He obtained the postgraduate Diploma in Medical Jurisprudence in Pathology from London in 2005, and possesses a certificate of eligibility for specialist registration by the General Medical Council, UK. He underwent post-doctoral training at the Victorian Institute of Forensic Medicine, Melbourne, Australia. He has also worked at the Wellington hospital, New Zealand, as a locum Forensic Pathologist and as an Honorary Clinical Senior Lecturer at the Wellington School of Medicine and Health Sciences, University of Otago, New Zealand. He was invited to visit and share experiences by the Netherlands Forensic Institute in 2019. He was elected as a fellow of the College of Forensic Pathologists of Sri Lanka in 2021.

Dr. Deshanee Herath is a Temporary Lecturer at the Department of Forensic Medicine, Faculty of Medicine, University of Peradeniya. She obtained her MBBS in 2021 with Second class honours from the Faculty of Medicine, University of Peradeniya.

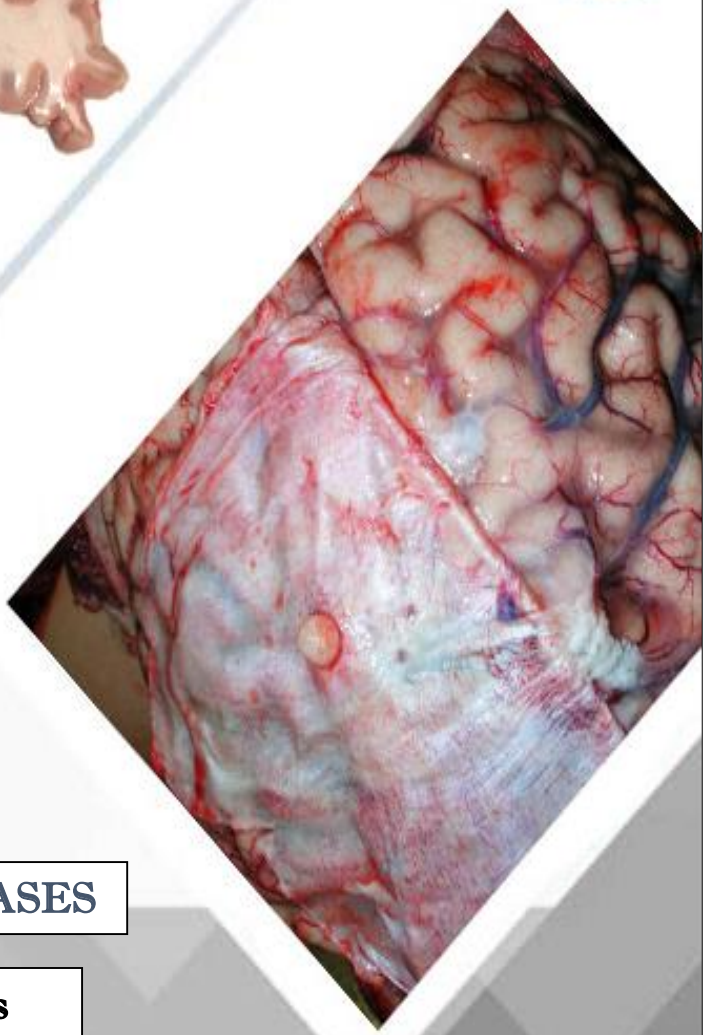
PREFACE

Forensic Medicine in Sri Lanka encompasses, both, examination of patients for medico-legal purposes and conducting autopsies in all unnatural deaths, in addition to those that the cause of death is not known. In the eyes of the justice system in Sri Lanka, all MBBS qualified medical officers are deemed to be competent to conduct, report and give evidence on medico-legal examinations of patients and autopsies conducted by them, as an expert witness. However, during their undergraduate training, they may not get the opportunity to assist, nor observe, a sufficient variety of representative of cases that may be encountered in the future.

Therefore, a series of e-booklets has been prepared to better equip medical officers to handle common conditions that are likely to be encountered in day to day forensic practice. The case histories, macro and micro images are from cases conducted by Prof. Dinesh Fernando. Ms. Chaya Wickramarathne did a yeomen service in the initial designing of lay out and formatting the booklet. The compilation of the case and photographs for publication was done by Dr. Deshanee Herath. This is being continued by Dr. Shashika Weerasinghe.

The content herein may be used for academic purposes with due credit given.

Any clarifications, suggestions, comments or corrections are welcome.



COLOUR ATLAS OF

FORENSIC PATHOLOGY

ILLUSTRATIVE CASES

CNS Tumours

Meningioma

Meningioma, a type of benign tumour, arises from arachnoid meningothelial cells and is usually attached to the dura mater. They may also be seen within the ventricular system, when they arise from the stromal arachnoid cells of the choroid plexus. Meningiomas are slow-growing tumours that can compress the underlying brain. Most meningiomas are easily separable from the underlying brain, but some may infiltrate the brain matter, a feature associated with an increased risk for recurrence. Some meningiomas may extend to the overlying bone. Multiple meningiomas may be seen, particularly when they are associated with neurofibromatosis.

Patients with meningioma can present with vague non-localizing symptoms like dysphasia, apathy and somnolence, or with focal neurological signs corresponding to the part of the brain compressed by the meningioma. These tumours can irritate the underlying cortex leading to new onset seizures. Intraventricular meningiomas may present with obstructive hydrocephalus. Clinical examination reveals signs due to raised intracranial pressure, cranial nerve palsies, compression of the parenchyma and involvement of the surrounding bone.

The cut surface of a meningioma could be translucent pale or homogenously reddish brown. There can be morphological variants like cavernous sinus meningioma, which infiltrates the cavernous sinus. There can be various histological patterns, namely, syncytial, fibroblastic, transitional, psammomatous and secretory. Atypical meningiomas have characteristic histological features and higher mitotic rates. Anaplastic (malignant) meningiomas are a highly aggressive form of tumours that may resemble sarcoma or carcinoma. Surgery is the definitive treatment but may not be feasible due to the location of the tumour. There is a role for fractionated external beam radiotherapy and also stereotactic radiosurgery in the management of inoperable, recurrent and residual meningiomas.

History

A 59-year-old female, with progressively worsening shortness of breath, presented with severe dyspnoea. Her condition worsened over time and she died after being connected to a ventilator.

Internal Examination

Central Nervous System: The meninges were smooth, glistening and transparent. A firm white meningioma measuring 0.7 cm in diameter was present on the right parietal lobe situated 2 cm away from the midline. It had caused a depression in the underlying cortex. An irregular soft growth was present attached to the dura in the left middle cranial fossa measuring 3.5 x 2 cm. This had caused a depression on the inferior aspect of the left temporal lobe. The intracranial vessels had atheromatous plaques. There were no aneurysmal dilatations. Cross sections of the cerebral hemispheres, brainstem and cerebellum were unremarkable.

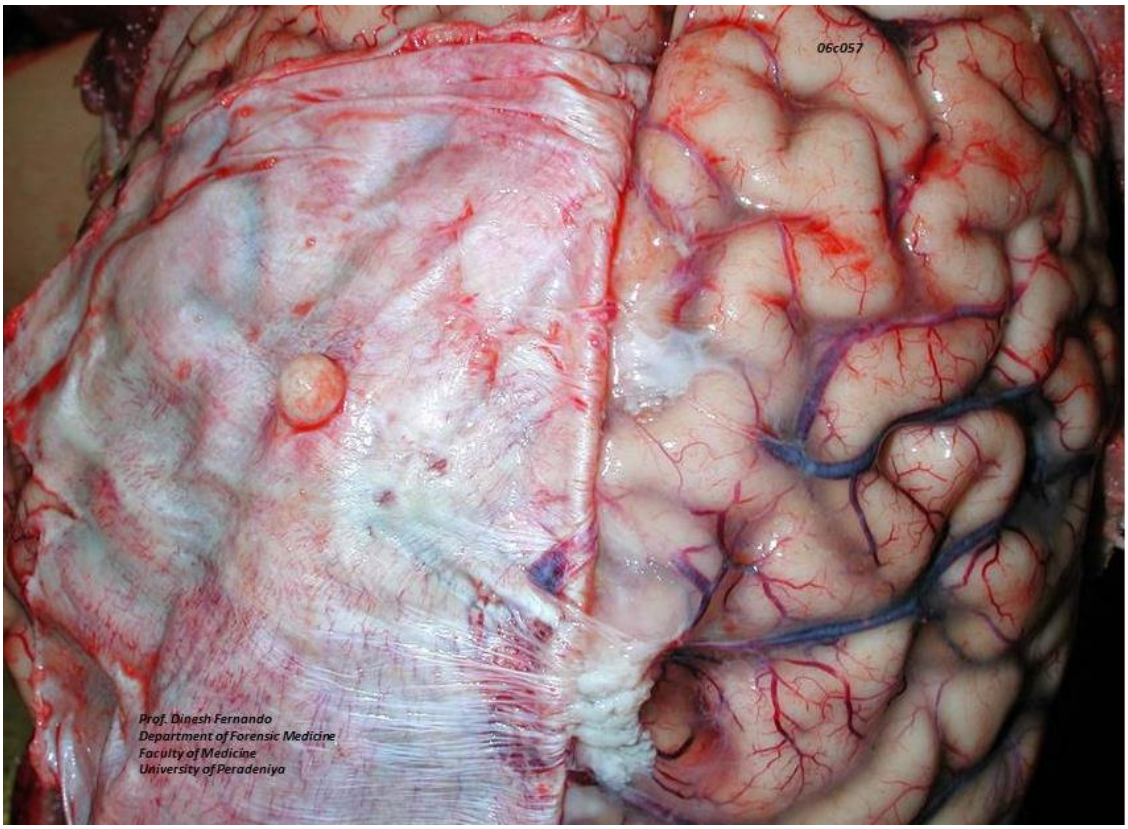


Figure 1: A firm white meningioma on the right parietal lobe situated 2 cm away from the midline.

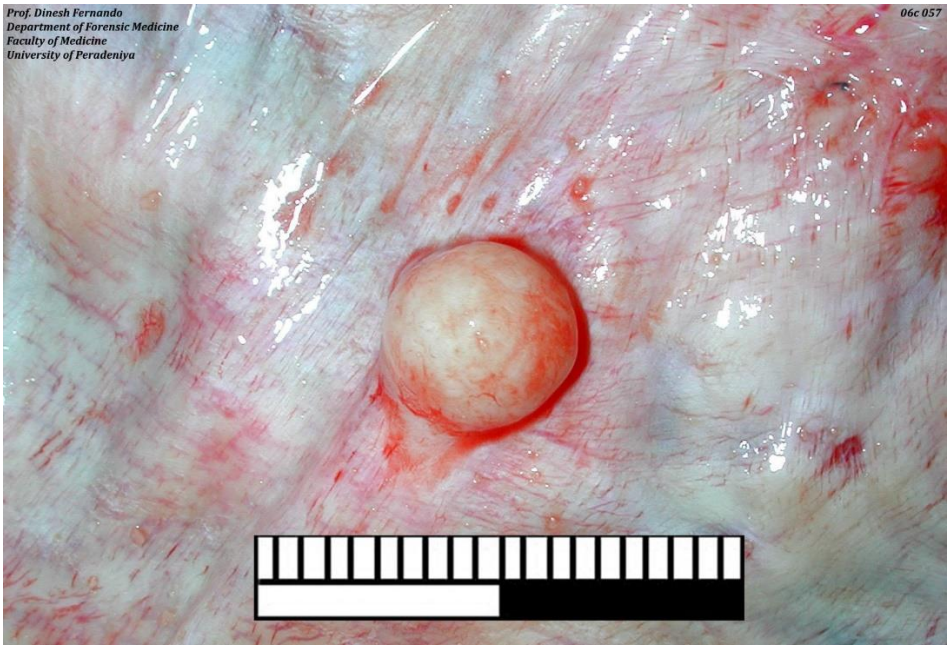


Figure 2: Meningioma measuring 0.7 cm in diameter

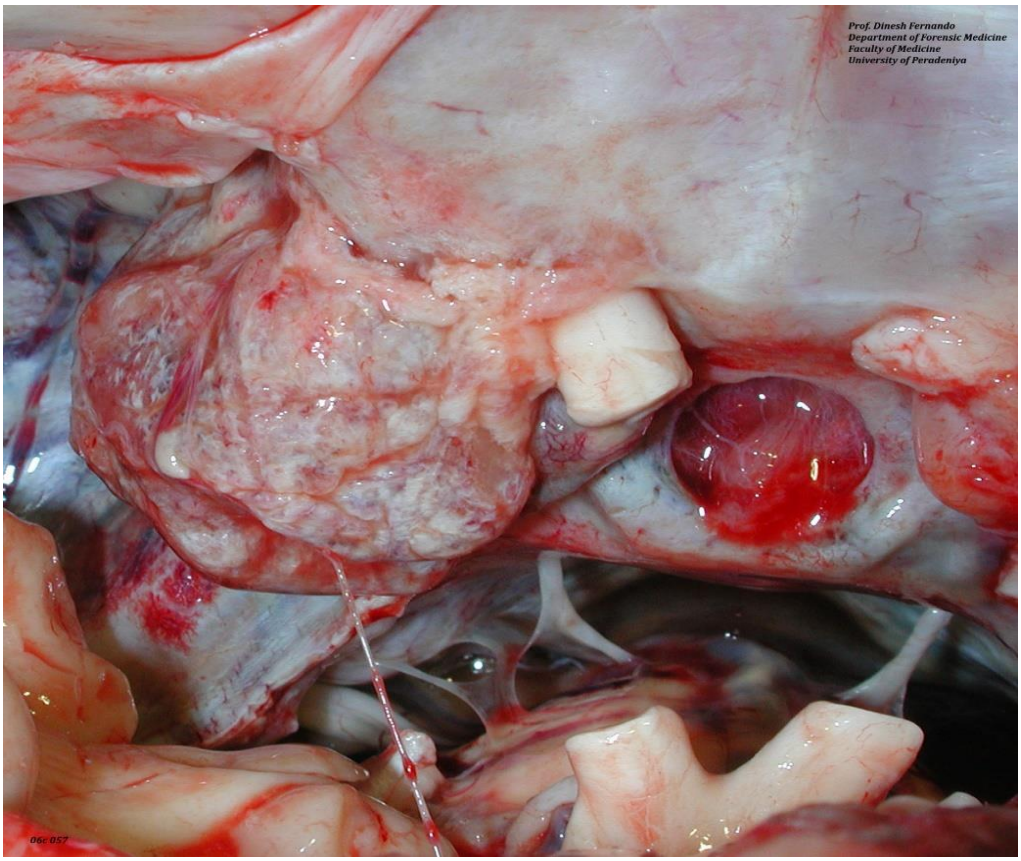


Figure 3: An irregular growth attached to the dura in the left middle cranial fossa

History

A 36-year-old male, fell unconscious while engaging in sports activities and was declared dead on admission. He had recently been suffering from headaches. A tumour attached to the optic nerve had been diagnosed three years previously, while a brain tumour had been removed seven years previously.

External Examination

An irregular, grazed abrasion measuring 3 cm x 2 cm was observed on the lateral aspect of the right elbow.

Figure 4: Grazed abrasion on the right elbow

Internal Examination

Central Nervous System: A partially healed bone flap measuring 7 cm x 7 cm was present in the right frontal region. The brain weighed 1,528 grams and had an area of old necrosis in the right frontal pole. The meninges were smooth, glistening and transparent. A mass which measured 1 cm x 0.5 cm was attached to the meninges in the right middle cranial fossa close to the midline. Significant atheroma was present in the right side of the Circle of Willis with dilatation at the branch point of the middle cerebral artery. Atheroma was also present in the right posterior cerebral artery. Multiple cross sections of the cerebral hemispheres showed a yellowish gold coloured cystic region measuring approximately 1 cm in diameter in the right frontal lobe.

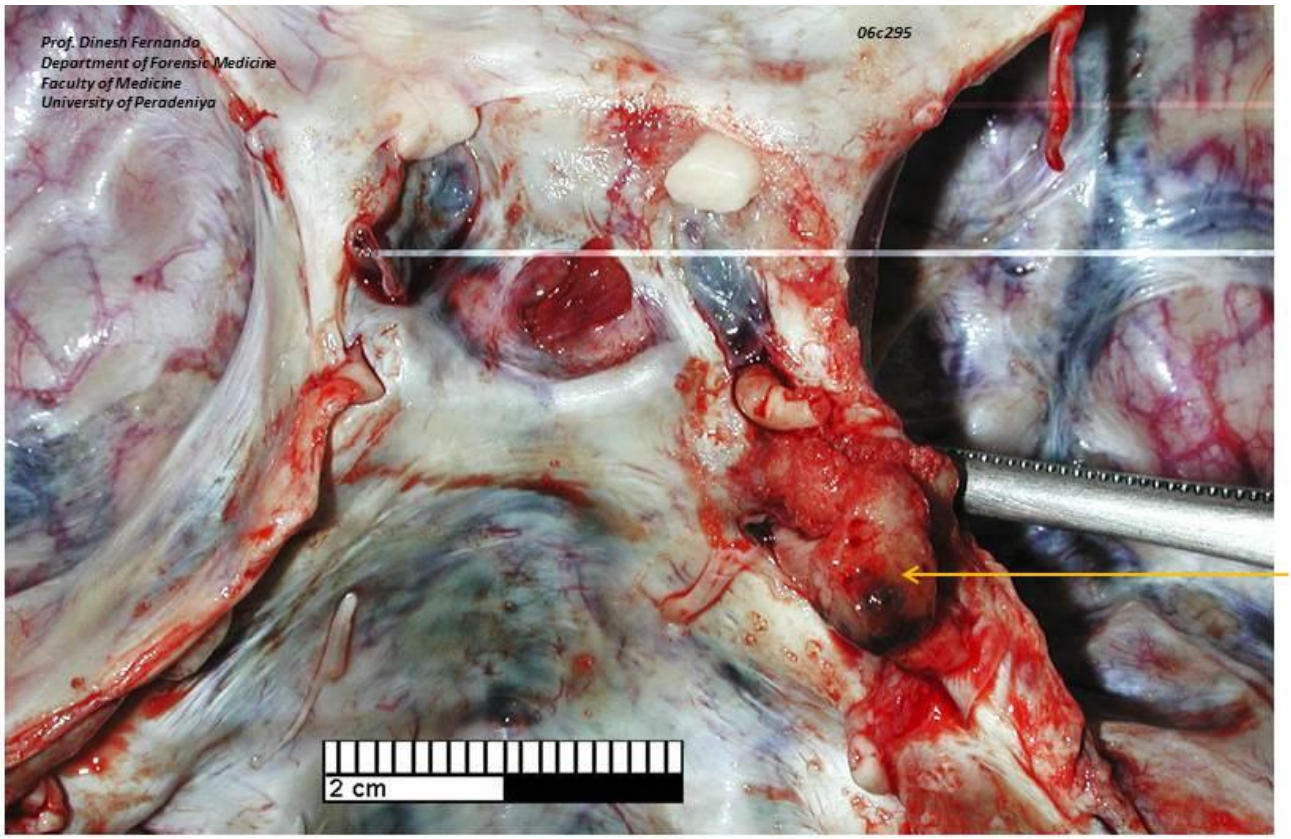


Figure 5: A mass in the right middle cranial fossa close to the midline

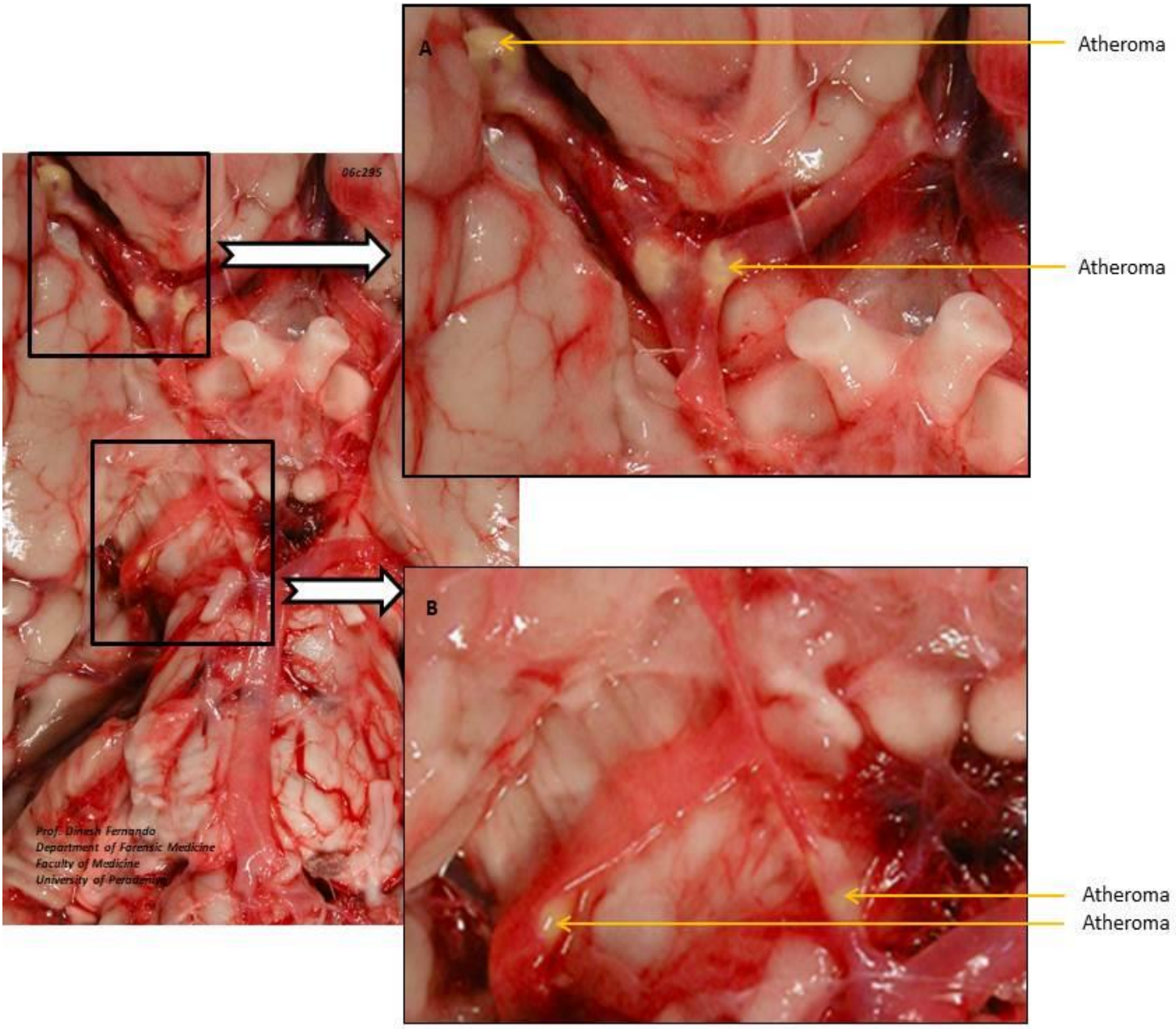


Figure 6: A) Atheroma in the right side of the Circle of Willis with dilatation at the branch point of the middle cerebral artery.

B) Atheroma in the right posterior cerebral artery.

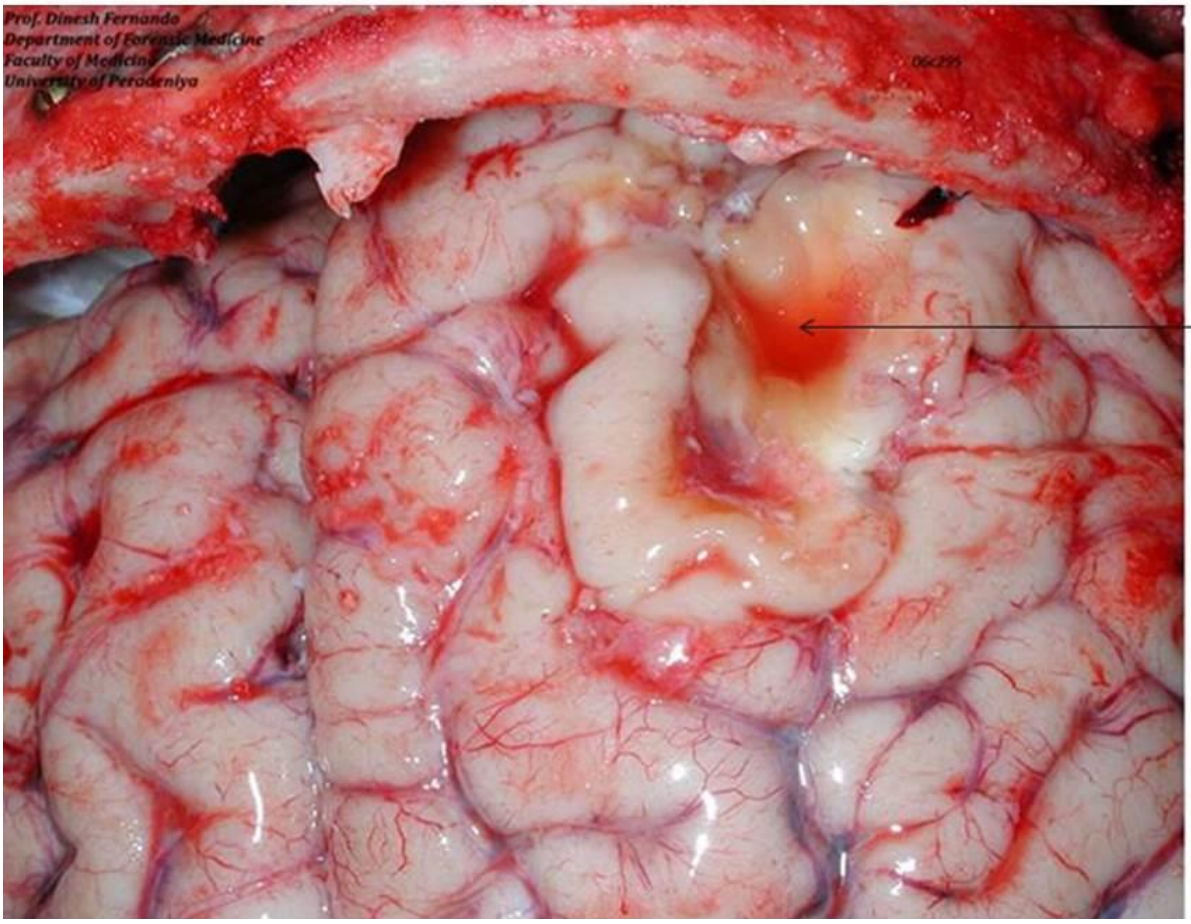


Figure 7: Yellowish gold coloured cystic region in the right frontal lobe

Figure 8: Cystic space in the cross section of cerebral hemisphere.

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