Interpretation of Emergency Head CT

A Practical Handbook

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Dedicated to my wife Jill for her support, help and love over the years. **E. J. H.**

I would like to dedicate this book to my father, Iain, for being my inspiration and mentor. **A. F-H.**

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PREFACE

Welcome to the first handbook of CT brain interpretation. Focus has been placed on including a greater number of images than would normally be found in a book of this size. The resolution has been heightened and the accompanying text limited to precise details, in order to achieve our goal: that is to equip a wide variety of medical professionals with a general understanding of head CT. A schema is provided by which to analyse the images, in order to develop greater confidence to diagnose the most common and critical problems. It is hoped that this book will be invaluable to individuals who find themselves, more and more, in the acute decision-making setting. This includes Emergency Physicians, Surgeons, Neurosurgeons, Trauma or Orthopaedic Surgeons, Radiographers and Elderly Care physicians. It is also intended to be instructive to radiology trainees and medical students alike. All choice topics are included, thus lending itself as an excellent revision aid for anyone preparing for a postgraduate exam. Small enough to carry around, we hope we have provided a reliable reference for what you need to remember, regardless of the time of day or night.

ABBREVIATIONS

ACom	Anterior communicating
APTT	Activated partial thromboplastin time
AVM	Arteriovenous malformation
BP	Blood pressure
CCF	Congestive cardiac failure
CSF	Cerebrospinal fluid
CT	Computer tomography
CTV	CT venogram
CVA	Cerebrovascular accident
ECA	External carotid artery
ECG	Electrocardiogram
EDH	Extradural haemorrhage
ETA	Estimated time of arrival
ETT	Endotracheal tube
GCS	Glasgow Coma Scale
HR	Heart rate
HU	Hounsfield Unit
i.m.	intramuscular
INR	International normalised ratio
i.v.	Intravenous
ICA	Internal carotid artery
LP	Lumbar puncture
M:F	Male:female
MCA	Middle cerebral artery
NICE	National Institute of Clinical Excellence
PCom	Posterior communicating
RIND	Reversible ischaemic neurological deficit
RR	Respiratory rate
SAH	Subarachnoid haemorrhage
SDH	Subdural haematoma
SLE	Systemic lupus erythematosus
SSS	Superior sagittal sinus
TIA	Transient ischaemic attack
WCC	White cell count

INTRODUCTION

Computer tomography (CT) is now widely available and is being used more and more, unlike magnetic resonance imaging, 24 hours a day, 7 days a week. CT is often the initial imaging modality of choice; not only for diagnosis but also to guide treatment.

The most common request for CT out of hours is brain imaging. CT is a vital tool in the assessment of patients with serious head injury. It remains the investigation of choice for the assessment of acute haemorrhage and bony injury. Consequently, patient management has been transformed since its inception, as rapid imaging and diagnosis of intracranial pathology can facilitate emergency intervention. Equally, a delay in diagnosis, and treatment, may adversely affect outcome and prognosis.

Patient's expectations of modern medical technology are high. There are ever-increasing time pressures to form rapid diagnoses, and improve efficiency, in the face of a more litigious society. The European Working Time Directive is likely to make doctors feel more vulnerable, with shift patterns reducing personal experience and training opportunities. Furthermore, the multidisciplinary team on duty in the *Hospital at Night Scheme* may not possess the appropriate expertise between them to interpret emergency imaging. Yet, the NICE guidelines are in place to further increase the number of CT scans performed out of hours. To add to this, the nationwide shortage of radiologists results in a limited CT service available out of hours. Hence we have the dilemma of how to provide an adequate emergency imaging service coupled with who will interpret the images.

The College of Emergency Medicine has stipulated that Specialist Registrars in Emergency Medicine are expected to be able to diagnose brain pathology from CT scans of the head. Currently, in many hospitals around the country it is routine for CT head scans, performed out of hours, to be interpreted by the requesting doctor. This is likely to be a progressive future trend, with a variety of speciality groups needing to acquire these skills.

Analogous to this is ECG interpretation; originally the domain of the Cardiologist, this is now a routine general investigation interpreted by most clinicians. It is not inconceivable that medical students, and junior medical staff alike, may need to acquire the basic skills to analyse CT abnormalities in the future, if we are to keep pace with the ever-increasing demand.

The purpose of this book is to provide a systematic approach by which to interpret and *provisionally* report head CT scans, based on learning to recognise common pathologies from an archive of representative images.