

IMAGING IN THE 21ST CENTURY

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Ian Duncan obtained the degree MB BCh from the University of the Witwatersrand in 1985, and did his radiology registrarship at the same university. He was a consultant radiologist at Johannesburg Hospital from 1994 to 1996, where he headed the

interventional unit. He entered private practice at Sunninghill Hospital in August 1996 and established an angiography unit there.

We are now past the dawn and into the early morning of the 21st century. The close of the 19th century brought with it an exciting new diagnostic tool in medicine – the application of X-ray imaging of the human body. Following the discovery of X-rays by Wilhelm Roentgen in 1895, the first medical diagnostic use of the new physics occurred the following year. Roentgenology was established as a medical speciality in 1910. Radiographic studies at that stage and for the next 78 years would consist of variations of either static film acquisition or real-time fluoroscopic examination.

Medical X-ray technology arrived in South Africa in 1899 with the establishment of a British Army field X-ray unit at Ladysmith during the Boer siege.

In 1923 the first contrast arteriographic study in a human was performed. The medical use of ultrasound was pioneered during the late 1950s. Computed axial tomographic (CT or CAT) scanning was introduced in 1972, and magnetic resonance imaging (MRI) in 1981. Each of these imaging modalities has subsequently undergone numerous levels of improvement, principally involving such factors as image resolution (quality) and acquisition speed, but also in methods of image storage and presentation and image manipulation (post-processing). These changes have led to the current radiological armamentarium of digital imaging, high-resolution and ultrafast CT scanners, high-resolution ultrasound imaging, and faster, better and even higher field-strength MRI scanners. Faster computing power allows the raw data obtained by these modalities to be processed rapidly into complex multiplanar, three-dimensional and even functional image presentations.

Finally, modern computer technology allows images to be stored in digital format, facilitating the storage, retrieval and transfer of images. More and more hospitals and X-ray departments worldwide are employing digital Picture Archiving and Communication Systems (PACS). The quality of the images obtained with digital radiography is now close enough to that obtained by conventional film studies to be diagnostic in nearly 100% of cases. One need only look at the quality of modern digital photography to be convinced of that!

This issue of *CME* serves two purposes: firstly to reiterate and reinforce some of the fundamental applications of diagnostic imaging in various clinical scenarios, and secondly to show how the newer generations of the basic imaging modalities can be used to improve upon the level of diagnostic accuracy. A prime example of this would be the current preferred use of multislice CT in the diagnosis of urinary tract stones, especially in patients who present with acute renal colic. Gone are the days of the intravenous pyelogram and ultrasound as the investigations of choice in this setting. The modern radiologist is now playing a resurgent role in cardiac imaging with non-invasive multislice CT and MRI cardiac imaging. There are good alternatives to catheter angiography for vascular diagnosis.

And so the list of newer applications goes on. The articles in this issue are intended to give you some insight into the rapidly changing world of diagnostic radiology at the beginning of the 21st century.

WE HAVE A WINNER!

Congratulations to Dr E Bovim, who won a simcard back-up device in our lucky draw of respondents to our recent reader survey.

Thanks to all who participated.

We learned a lot from you, and the survey results will be discussed in a future issue of *CME*.