Why computed tomography is needed in Papua New Guinea

Computed tomography (CT) was introduced in the 1970s and rapidly transformed diagnostic imaging, especially in neurology and neurosurgery. Direct images of brain pathology could be seen and therapy could be precisely directed to the pathology. As a result of more accurate diagnosis, the mortality of various conditions began to fall. For instance, the mortality of brain abscess fell from >40% before CT to approximately 10% following its introduction (1,2), and the mortality from severe head injuries fell from 60-80% to 20-30% in specialized centres (3,4).

The priorities of health care for Papua New Guinea (PNG) are preventive health and primary health care. However, specialist medical services are also a necessity. There are well-organized specialist services in the hospitals of PNG and this results in improved health outcomes for many PNG citizens. PNG has self-sufficiency in the training of medical and surgical specialists. The first author (WMK) is the first national surgeon to train and qualify in neurosurgery. Many brain disorders can potentially be treated in PNG (5), but the absence of CT scanning makes this very difficult. There are strong arguments for the acquisition of CT imaging for the Port Moresby General Hospital (PMGH), which is the principal referral centre for neurological disorders in Papua New Guinea. The people of PNG are becoming increasingly aware of health issues and what treatments are available internationally and increasingly are demanding access to CT. The risk of litigation may also increase without the support of CT-guided diagnosis.

The sole CT scanner for PNG is a private scanner in Port Moresby but this is clearly inadequate to meet the health needs of the whole population. It is inaccessible to most patients because of distance and cost. We have seen many families borrowing heavily and entire villages using valuable income to pay for a private CT scan. It is also impractical and dangerous to transport sick patients from PMGH to another hospital for CT scanning.

CT scanning and now magnetic resonance imaging (MRI) are the key to modern diagnosis and treatment in neurosurgery and neurology. Most pathology in the brain is not adequately diagnosed by the present diagnostic modalities in PNG such as ultrasound, plain X-rays and angiography. CT scan is required to diagnose life-threatening mass lesions such as abscess, haemorrhage and tumour. These lesions can then be treated by the appropriate surgery. Neurosurgery is limited and less safe without CT. We do not believe a neurosurgery service in PNG is viable without CT.

A high trauma caseload results in about 90% of neurosurgery admissions at PMGH being head injuries (6,7). CT is indispensable for the decision-making in these cases. 30% of the surgical deaths over the last 30 years have been due to traumatic brain injury (TBI) despite it being responsible for only 5% of admissions (8-10). The victims are usually young and healthy. The mortality and morbidity of severe TBI is a heavy loss and a burden to PNG society. 35 (51%) of 68 cases of severe TBI with a Glasgow Coma Score (GCS) of less than 8 in 2003-2004 were either dead or severely impaired (6,7). Early and precise diagnosis of head injuries with CT scan is needed to reduce this morbidity and mortality. We know of a number of cases of diagnostic burr holes being negative in patients with TBI, which would not occur if CT were available (6,7). Intracranial haematomas may be missed without CT resulting in preventable morbidity or mortality. CT is far superior to plain radiographs for the precise diagnosis of spinal fracture/dislocations.

Lack of CT in PNG is one important reason why many brain tumours are diagnosed at a late stage when only palliative care can be offered. Early CT scan and neurosurgical intervention would achieve better results. The high number of paediatric neurosurgical cases especially tumours warrants the availability of CT scan to help the children of PNG (6,7). At PMGH, brain tumour is the commonest solid tumour in children though
fewer than 30% of the brain tumours at PMGH are in children. The diagnosis and treatment of pituitary tumours, which are relatively common in highlanders, is severely compromised without CT.

CT is also indispensable for the diagnosis and staging of neoplasms in soft tissue and bone and its availability would improve the quality of surgery and outcome. CT is essential for the investigation of patients with medical conditions such as stroke, epilepsy and coma. Most of the patients in acute coma at PMGH are treated on clinical grounds as malaria or stroke and slower-onset coma is often treated with TB (tuberculosis) therapy. CT of the chest, abdomen and pelvis is very important in trauma, in the diagnosis and staging of solid tumours and in the investigation of infection, particularly concealed infection in the body cavities. CT myelography is very useful in the diagnosis of disc prolapse and intraspinal mass lesions.

Medical research, teaching and training would also receive a tremendous boost with the acquisition of a CT scanner. CT scanning is now 35 years old and is essential for hospital-based specialist care. Precision in diagnosis using CT is likely to reduce hospital costs and shorten hospital stay by allowing physicians to choose better treatment options earlier. We urge the Government of Papua New Guinea to introduce CT scanning in the public health service. This should start in Port Moresby, the centre for teaching and training, but must also be planned for the level two hospitals. The people of PNG deserve no less.

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