

CLINICAL SIGNIFICANCE OF ANATOMICAL VARIATIONS

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Anatomical variations may influence predisposition to diseases, symptomatology, clinical examination, investigation and patient management including operative surgery (Willan and Humpherson, 1999). Accordingly, accurate knowledge of variability in human morphology is important to improve diagnostic and interventional performance especially against the background of contemporary imaging techniques such as echocardiography, magnetic resonance imaging, computerized tomography, endoscopy; open and laparoscopic surgery (Jones et al., 2002). Indeed, there are reports that a substantial proportion of clinical malpractice may be attributed to ignorance of anatomical variations. This realization has informed inclusion of anatomical variations among the aims to be considered in medical curricula, renewed research interests and encouragement of anatomists to publish articles on this subject in the era of molecular biology and genetics (Sanudo et al., 2003). Indeed many journals, such as *Clinical Anatomy*, have devoted a whole section - compendium of anatomical variations - to this subject.

In tandem with this, the second issue of this African Journal of Anatomy has devoted 3 of the 4 case reports and 3 of the 6 original articles to anatomical variations. Although nearly all possible human anatomical variations have been reported and catalogued (Bergman, 2011), their combinations continue to arouse interest. Secondly, there appear to be ethnic differences in the frequency of these variations. Consequently, there is need for continuous appraisal for emphasis and to encourage anatomists and clinicians to beware of their existence.

The article by Karau and Odula (2013) presents important morphometric data on foramina transvasaria of the atlas. The data are important to neurosurgeons when they are operating on the upper cervical spine and to radiologists in the interpretation of radiographic and CT scan films. Such studies are important to minimize operative inadvertent damage to the vertebral arteries. (Murlimanju et al., 2011). Since the morphometric data are usually population specific, more such studies in different populations are recommended.

Biceps brachii is one of the most variable muscles in the Human body in terms of number and morphology of its heads. Although three heads are the most common, upto 7 heads have been reported (Poudel and Bhattaral, 2009). Since, this study shows ethnic variability (Cheena and Singla, 2011), the article on supernumerary heads of biceps brachii muscle in the South Indian population (Suhani et al., 2013) is a useful addition to literature. This variation may confuse surgeons during shoulder and arm surgery leading to iatrogenic injury (Rai et al., 2007; Nayak et al., 2008) Further, it may cause compression of neurovascular structures because of their close relationship to the brachial artery and median nerve.

Understanding variations of peripheral nerves is important in the diagnosis of unexplained clinical signs and symptoms as well as during nerve blocks and surgical procedures (Haviarova et al., 2009). Median nerve entrapment by the heads of pronator teres in the so called pronator teres syndrome is well known (Henry, 2008). High penetration of pronator teres muscle by median nerve such that it is absent from the cubital fossa as described by Shetty et al., (2013) is unusual. Two other variations associated with it in this case, namely high origin of pronator teres muscle and continuity of brachialis with branchioradialis muscle, comprise significant variations of cubital fossa anatomy. Surgeons performing procedures involving neoplasms or repair of traumatic lesions in this region need to be aware of these variations. (Budhiraja et al., 2011).

Organization of the superficial palmer arterial arch is important for safe and successful surgery during arterial repairs, vascular graft applications, free and/or pedicle flaps following injury or in correction of deformities. Knowledge of whether the ulnar or radial arteries predominate, and of the branching pattern provides a valuable source of information to the vascular

surgeon necessary to avoid injury that may result in acute ischaemia (Mathew and Ebby, 2012). Nair et al., (2013) report a rare variation of the arch in an Indian population. In view of this and numerous other variations (Mathew and Ebby, 2012; Koirala and Baral, 2012) it is recommended that before surgery, unusual patterns should be identified and located through Doppler ultrasound, modified Allen test , pulse oximetry and arterial angiography.

Knowledge of the anatomy of the cystic artery has been considered a precondition for performing safe laparoscopic cholecystectomy (Ding et al., 2007). This artery, usually a branch of the right hepatic artery, may also arise from left hepatic, hepatic artery proper, common hepatic artery, superior pancreaticoduodenal, and superior mesenteric arteries and gastroduodenal (Vishnumaya et al., 2008). Origin from the gastroduodenal artery is called low lying artery which does not pass through Calot's triangle but approaches the gall bladder beyond it. The case reported by Mahajan and Agnihotri (2013) in the current issue elucidates unusual origin and course in relation to Calot's triangle. In such cases the artery is more vulnerable to injury and subsequent hemorrhage during dissection of the peritoneal folds that connect the hepatoduodenal ligament to Hartman's pouch; or any other operations in the subhepatic region (Bincy and Somayaji, 2010). Accordingly, laparoscopic surgeons must be aware of the wide array of variations.

A remarkable aspect of the variations reported in the current issue is that they were identified on cadavers. Unfortunately, continuous appreciation of variations is being undermined by current trends in the undergraduate medical training characterized by reduced exposure to dissection and dissected specimens , increased use of plastic bones, computer generated images, loss of experienced

teachers especially those who are medically trained and loss of morphological approach (Willian and Humpherson, 1999). The most powerful means of presenting and learning anatomy as a dynamic basis for solving problems is cadaver dissection (Older, 2004). Consequently, a call has been made not to allow anatomical science to weaken further or replace conventional human

dissection teaching approaches (Bergman, 2011). In this spirit, the article on excellence in teaching of Human Anatomy (Ogeng'o et al., 2013) constitutes a strong addition to calls for reinforcement of cadaver dissection as a teaching and learning tool to mitigate declining Human Anatomy standards.

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