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Commentary

Need for a nomogram of renal sizes in the Indian population

The determination of normal renal size in any population is important in the diagnosis, treatment and prognosis of renal disease[1]. Renal size estimation can be performed measuring renal length, renal volume, cortical thickness or volume. The most accurate of these parameters is renal volume[2,3], as the shape of kidney varies considerably. Renal length is, however, the most clinically useful parameter, due to its low inter-observer variation and better reproducibility[2]. Different imaging modalities such as conventional radiographs, intravenous urography (IVU), ultrasound (US), computerized tomography (CT) and magnetic resonance imaging (MRI) have been used to estimate renal size. However, the most accurate of these modalities are the MRI and CT, because these can acquire three-dimensional data and, therefore, do not rely on geometric assumption to estimate organ volume unlike the ultrasonography that is used to measure kidney size in two dimensional nature[3].

The use of CT as a routine non invasive method to estimate renal size is limited by the need for ionizing radiation and potentially nephrotoxic contrast media. Conversely, MRI has the benefit of acquiring true tomographic data along any orientation without constraints of ionizing radiation and nephrotoxic burden[3]. It is however, very expensive and not readily available especially in the rural and semi-urban areas where majority of population resides. Ultrasound is also known to underestimate renal size by about 20-29 per cent, while MRI underestimates it by about 4-5 per cent[3]. In spite of its shortcoming, renal size estimation using US is still a safe, simple and non invasive method with many advantages over other imaging modalities. These advantages include usage of non ionizing radiation, little or no patient preparation and no medication or injection of contrast media. It is also readily available, less expensive and easily reproducible to a large extent[4]. It should also be noted that renal dimensions measured by using US are smaller than those obtained by using radiography, because no geometric magnification and osmotic diueresis caused by intravenous contrast medium occurs[5].

Thus, the use of US by Muthusami and colleagues[6] is a good approach as a portable US machine can be made readily available in the nooks and cranny of Indian subcontinent, whenever a large scale study is to be carried out. This cross-sectional study used patients referred for ultrasound examination for non-renal indications; this could have introduced a major selection bias. Since it is a study that was intended to assess the trends and collect preliminary data in healthy Indian adults[6], it would have been better to recruit the subjects from the community and in population with no apparent medical conditions and optimal renal status based on calculated estimated glomerular filtration rate (eGFR) using serum creatinine as done in other studies[1,7].

It is a well known fact that abnormalities of kidney size are present in many renal diseases. Kidney size using either renal length or volume as a unit of measurement, is an important clinical parameter in the evaluation and follow up of kidney transplant patients[8,9]. It is, therefore, valuable to have a set of standard sonographic measurements to use when these patients are examined in a given population[7], these seems to be lacking in the Indian population as stated by the authors of this study[6]. The measured parameters used in this study[6] have been shown by many authors to be a good indicator of kidney weight and volume as well as its functional state, it is for this reason that longitudinal axis of the kidney is used as a reliable parameter during clinical examination[10-17].

The data from the study have justified the need for a nomogram in Indian population, this could be gleaned from the range of values of renal length determined in this study, in which some individual who are "healthy" may be having renal length of less than 9 cm that is widely acceptable as a cut-off to indicate irreversible renal damage in many populations[18].

The result of this study also showed that the mean renal length in an Indian population was smaller than the Caucasians, Brazilians, Korean and Japanese population, but closer to values in the Pakistanis, Malaysians, Nigerians and Jamaicans. The reasons for this was ascribed to be due to difference in height, weight, BSA, BMI and other anthropometric measurements among races. The authors have shown a positive correlation between renal length and weight, height and BMI[6], and this has been corroborated by other study[19].

The authors also raised a valid point for a need to assess the possibility of racial differences of renal dimensions independent of body sizes, as they found that the renal dimensions in Indian population were smaller than the other races of smaller built such as the Pakistanis, Koreans, Iranians and Japanese compared to the Caucasians, normally of big stature. It was worthy to note that no significant differences were found between the mean left and right renal lengths or gender dependent differences[6]. It is well established by several studies[1,2,4,18,20-23] that the mean left kidney length is more than the right kidney length and female kidneys are usually smaller in size when compared to that of males.

Studies have shown that renal length gradually decreases as age advances and this decrease accelerates after the seventh decade of life[23]. The findings of muthusami *et al*[6] also agree with this, as there was significant decline in bilateral renal length after the age of sixty years. The explanation is that the number of nephrons per normal kidney which varies between 400,000 and 1,000,000, diminishes with advancing age and sex[24].

The data from the study in this issue[6] have demonstrated the need for a nomogram in Indian population, as knowledge of normal kidney dimensions is valuable for accurate assessment of the abnormal kidney[25]. However, it is advisable that healthy individuals from the community are to be studied instead of hospital patients without apparent renal impairment. The paucity of data on this topic in the Indian subcontinent makes it imperative for this study to be carried out on a large scale.

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