

Letter to the Editor

Ovarian Shielding during Pelvis Radiography: Risk Versus Benefit

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DEAR EDITOR,

Radiography of the pelvis is one of the most common and more frequent radiographic examinations ordered, especially in children [1]. It is estimated that annually a million pelvic radiographs were documented in the UK [2] with frequency of 39 per 1000 of population [3]. Since the 1950s, much focus has been placed on pelvis x-ray examination due to it is associated with direct gonad irradiation [3,4]. The gonads in the pelvic region are particularly sensitive to the effects of radiation [2]. Irradiating the germ cells within the gonads can result genetic mutations and malignant changes which has the potential to expresses in future generations [5,6]. Although the radiation dose associated with a singular pelvic x-ray is relatively low [2], its stochastic risk to the population should not be underestimated due to its wide application. Therefore, it is essential that the dose is kept "as low as reasonably achievable" (ALARA).

Gonad shielding has extensively been advocated to reduce radiation exposure to the reproductive organs and following radiation risk in patients undergoing pelvis radiography [1,2]. The popular practice of the gonad shielding is placement a lead shield in the mid-sagittal line of the pelvis, directly on the basin pelvis (true pelvis) to the females and on the stratum region to the males [7]. According to protocol, the gonad shield should completely covered the gonads as it does not interfere with obtaining the required diagnostic information [6,8]. The testicular shielding usually is effective due to their superficial location [6]. In contrast, the ovarian shielding during pelvic radiography is associated with some main concerns.

Firstly, the ovaries due to locating in the abdominal cavity are not easily located using external landmarks [6]. Therefore the ovarian shields were frequently non-optimally positioned. So provides little or no protection to the one or both the ovaries [8], especially in pediatric who they are as much as 10-15 times more susceptible to radiation induced malignancy than in adults [9]. Inadequate positioning of the shield may lead to obstruction of the anatomy of interest and result in a repeat examination being required. The extra radiation dose associated with these repeats may result be a dose increase and more harmful than a single unshielded exposure [5]. Frantzen *et al.*, [8] conducted

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a retrospective study on 500 pelvis radiographs and reported that gonadal shields were incorrectly positioned in 91% of girls radiographs, as in 28% of them retake were required. Their finding has been replicated by Liakos *et al.*, [6].

Secondly, it has been identified that the ovaries have large spread positions in the pelvic comprising areas far from the region intended to be shielded (outside of the true pelvis) and almost always positioned laterally in the pelvis [7,8]. Fawcett *et al.*, [10] demonstrated that even an accuracy positioning of the shield will not provide protection to the ovaries in over third of children. Moreover it is accepted that distention of the urinary bladder can alter the position of the ovaries in pelvis region [10,11]. In fact to complete protection of the ovaries the entire pelvis must be shielded and clearly that it is impractical [7].

Considering recommendation of the international commission on radiological protection (ICRP) [12] that states "any decision that alters the radiation exposure situation should do more good than harm", it seems that the current practice of the ovarian shielding during pelvic radiography is more harmful than good and there are enough evidences to abandon ovarian shielding during pelvic radiography. This is significant due to the ovarian shielding during pelvis radiography is currently a worldwide practice.

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