CARDIOTHORACIC RATIO AS AN INDEX OF BODY FLUID BALANCE IN PATIENTS RECEIVING RDT

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In patients receiving RDT, ultrafiltration (UF) is monitored on an estimate of the ‘dry’ body weight (BW) which is largely empirical. Roentgenometric heart volume (HV) varies according to the blood thoracic pool [1] which in turn is largely affected by the state of body fluid balance [2, 3]. The aim of this study was to assess the value of HV and cardiothoracic ratio (CTR) in the evaluation of body fluid balance of RDT patients.

Methods

The acute and chronic alteration in body fluids were estimated from the changes in BW. HV was measured by the Lange method [4]. A total of 37 RDT patients, ten females, 27 males, aged 24 to 66 years, were studied.

Results

Both HV and CTR changes bore highly significant relationships with the BW % changes occurring over intervals of hours to weeks (Figure 1 (a), 1 (b), 1 (c)). The CTR changes, being closely related to those of HV ($r = 0.96, p < 0.001$), can be used as a straightforward index of the cardiac size variations (Figure 1(d)).

Eighteen patients, who had been judged on ‘dry’ weight by conventional criteria, showed increased heart size despite a mean arterial pressure (MAP) within the normal range. An increase in UF rate such as to reduce BW below its previously estimated ‘dry’ value greatly improved their cardiomegaly (Figure 2).

Conclusions

CTR measurements provide a simple and valuable guide for the achievement of the optimal fluid balance in RDT patients.

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Figure 1 (a, b and c). Changes in heart volume (HV) and cardiothoracic ratio (CTR) compared to changes in body weight (BW) during dialysis.

(d) The relationship between changes in heart volume and changes in cardiothoracic ratio during dialysis.
Figure 2. Changes in cardiothoracic ratio (CTR) following reduction in body weight (BW) and mean arterial pressure (MAP) by ultrafiltration (UF)

References

1 Nylin, G (1957) *Acta Card. (Brux.)*, 12, 588
3 Mehbood, H and Gutman, E (1971) *Radiology*, 100, 41