

## DISTRIBUTION OF MAINTENANCE DOSES OF DIGOXIN REQUIRED TO PRODUCE THERAPEUTIC SERUM CONCENTRATIONS IN ELDERLY PATIENTS

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Digoxin is prescribed widely for elderly patients but there is a well recognised fear amongst clinicians of relative overdosing. This may lead them to work on the assumption that 'the dose' for an elderly patient is 62.5 µg per day, even though a wide range of maintenance doses is prescribed for younger adults. We have determined the daily maintenance dose of digoxin which would be required to produce a mean steady state serum digoxin concentration within the lower part of the generally accepted therapeutic range in 46 compliant elderly inpatients of mean age  $81 \pm 6$  (1SD) years. Blood samples were taken for estimation of serum digoxin concentration on an average of 3.3 occasions per patient. Samples were taken 11 h after the preceding maintenance dose. A sample so timed allows a direct estimate of the mean serum concentration within the dose interval (Nicholson et al, 1980). The digoxin concentrations in the first and last samples from each patient were similar ( $p > 0.5$ , paired t-test), suggesting that steady state conditions obtained. The mean daily dose of digoxin given to our patients was  $102 \pm 34$  µg daily and the average mean steady state concentration achieved was  $1.08 \pm 0.59$  nmol/l. It has been shown (Dobbs et al, 1977) that in a given patient there is proportionality between the dose administered and the mean steady state concentration achieved. Assuming that this relationship holds for elderly patients, we calculated the maintenance dose of digoxin which would produce a mean steady state concentration of 1.6 nmol/l. This calculated dose was termed the 'dose requirement'.

The average dose requirement in our patients was  $189 \pm 110$  µg per day, mode 188 µg and range 31.25 to 500 µg. There was no difference in the distribution between patients over the age of 80 years and the younger elderly patients (see figure).

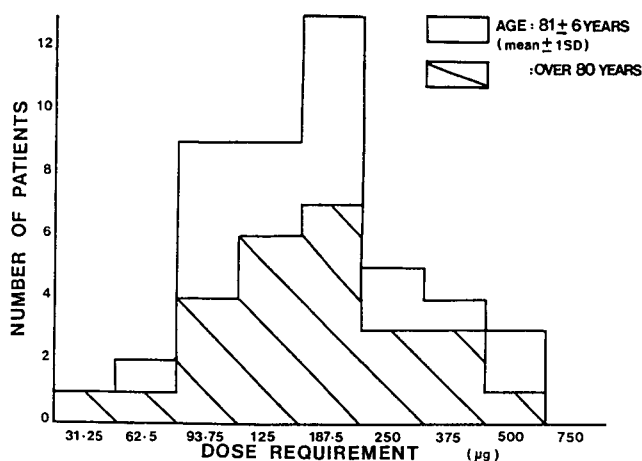


Fig. Digoxin dose requirement of 45 elderly patients.

In a previous study of 129 patients, aged  $59 \pm 12$  years, the range of dose requirements was identical, but with a mean of  $269 \pm 113$  and a mode of 250 µg (Nicholson et al, 1978). Thus, the diversity of digoxin dose requirement does not seem to diminish with age and fear of relative overdosing by clinicians may be depriving many elderly patients of the benefits of digoxin.

The dose requirement of our elderly patients, as calculated from the measured digoxin concentration, was  $1.8 \pm 1.0$  times greater than that predicted from their age, weight, sex and serum creatinine concentration using the equation of Nicholson et al (1978). This suggests that some elderly patients may have a diminished capacity to absorb digoxin.

Nicholson, P.W. et al (1980) Br. J. clin. pharmac. 9: 467-470.

Dobbs, S.M. et al (1977) Br. J. clin. pharmac. 2:168.

Nicholson, P.W. et al (1978) Br. Heart J. 40: 177-183.