derived from the simultaneous procedure to produce the appropriate correction factor for each point, rather than assuming a constant mean coefficient. This may have been understated in the text. This provides a first-order correction which makes an attempt to correct for spatially varying attenuation. It must be emphasised, though, that approaches of this form are empirical in nature and not exact solutions to the correction problem.

In our implementation, we calculate the first-order term C from the equation

$$C(x, y) = \left[\frac{1}{M}\sum_{i=1}^{M} \exp - \left(\sum_{r=1}^{(l,x,y,\theta_i)} \mu(x + r\cos\theta_i, y + r\sin\theta_i)\Delta r \right]^{-1}$$

where M is the number of projection angles used to calculate the attenuation term, l is the distance to the detector from (x, y) for θ_i, and the μ values are summed for each interval Δr over the total length $l(x, y, \theta_i)$. The value C is the inverse of the average attenuation to the point (x, y). It can be seen that this is equivalent to the formulation of Galt. In his case the product of exponents is calculated while in ours the exponent of a sum is calculated (i.e. $\Pi e^{x_i} = e^{\Sigma x_i}$). The latter form may be less expensive computationally.

All such approaches are, at best, approximations as the measured data are line integrals of the product of the activity at a point and the attenuation to that point. Also, convolution backprojection methods are ill-suited to datasets which are composed of two unknowns (namely, attenuation and radionuclide distribution). However, approaches such as those proposed by Moore (*3*) which involve iteratively adjusting the reconstructed activity distribution based on calculating errors between estimated projections and measured projections have promise as empirical solutions. We are currently employing such a method and have found that the solution converges very rapidly (typically after one iteration) if one forward projects the updated reconstruction through the known attenuation coefficient map. Illustrated below are results of first and second order corrections for computer simulated activity models of equilibrium blood pool, myocardial perfusion, and lung perfusion, all for technetium-99m. The distributions are based on attenuation sections and the 2-dimensional profiles are formed by projecting the known activity through the attenuation map. Iterative correction is then performed and results compared with the known count distribution.

	Heart counts			Lung counts		
Simulated distribution	True	1st	2nd	True	1st	2nd
Equilibrium heart pool	400	367	396	40	38	39
Myocardial perfusion	300	237	295	100	97	99
Lung perfusion	10	17	13	600	595	603

We believe that until better reconstruction algorithms, such as iterative estimation-maximization (EM) become practical, a 2nd order Chang correction using a known attenuation map will give sound quantitative results in a practical implementation.

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Sex and Menopausal Status of Subjects in Gastric Emptying Studies

TO THE EDITOR: In their recent report concerning studies of morbidly obese subjects (*1*), P.E. Christian and associates concluded that gastric emptying rates of solids and liquids contained in a 900-g meal did not differ between obese and nonobese subjects. In contrast, emptying of the solid phase of a 50-g meal was slower in obese subjects when compared to nonobese controls. We are uncertain about these conclusions because of their failure to match the study groups by sex and the absence of data concerning the menopausal status of the female subjects.

Christian, Datz and Moore have recently shown that gastric emptying rates are slower in women than in men (*2*) and presumably were aware of these trends at the time their revised manuscript was accepted for publication. Subsequently, they reported substantial differences in gastric emptying rates between menstruating and postmenopausal women (*3*). We have obtained similar results in our studies of gastric emptying (*4,5*).

In the studies of Christian et al., the obese subjects were predominantly female and the controls exclusively male. Since the ages and menopausal status of the females were not provided, it is difficult to draw appropriate conclusions about the data. An alternative interpretation of their data (based upon their subsequent studies and ours) could be that morbidly obese women empty a 900-g meal more rapidly than women who are not obese but empty a 50-g meal at rates similar to controls. Conclusions about morbidly obese males cannot be made on the information available.

Our studies and those of Christian and associates emphasize that consideration should be given to sex and menopausal status when evaluating gastric emptying in study populations. It therefore comes as a surprise that these considerations are absent in their recent report.

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REPLY: We thank Drs Wald and Hutson for their observations regarding out study on the effects of gastroplasty on gastric emptying in the morbidly obese (*1*).

At the time the article was written and revised, we had not completed our work on sex-related differences in gastric emptying (*2*). As pointed out in our recent abstract discussing the effects of progesterone and estradiol on gastrointestinal motility (*3*), most previous investigations of gastric emptying have not considered these effects. In fact, many investigators have not even given the sex of the subjects.

We do not have specific data concerning the menstrual history of the particular individuals in the gastroplasty study; however, since we saw an effect on the 50-g meal and not on the 900-g, it would appear some mechanism other than sex-related differences would more likely account for these observations.

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Correction to Appendix

In the article by Fine et al., "Measurement of Effective Renal Plasma Flow: A Comparison of Methods" (*J Nucl Med* 1987; 28: 1393–1400) the Appendix was printed incorrectly. The correct Appendix is shown below.

APPENDIX (1)

By the depth correction nomogram of Schlegel (see text): text):

$$\mathrm{ERPF_R} = \frac{100 \times (\mathrm{CPM_R}\ 1\text{–}2\ \mathrm{min}) \times y_R^2}{\mathrm{dose}}$$

$$\mathrm{ERPF_L} = \frac{100 \times (\mathrm{CPM_L}\ 1\text{–}2\ \mathrm{min}) \times y_L^2}{\mathrm{dose}}$$

$$\mathrm{ERPF_R} = \frac{100 \times (\mathrm{CPM_R}\ 1\text{–}2\ \mathrm{min}) \times y_R^2}{\mathrm{dose}}$$

$$\therefore \frac{\mathrm{ERPF_L}}{\mathrm{ERPF_R}} = \frac{\mathrm{CPM_L}}{\mathrm{CPM_R}} \frac{y_L^2}{y_R^2}$$

Whereas $\frac{\mathrm{ERPF_L}}{\mathrm{ERPF_R}}$ (uncorrected) $= \frac{\mathrm{CPM_L}}{\mathrm{CPM_R}}$

$\therefore$ % change in $\frac{\mathrm{ERPF_L}}{\mathrm{ERPF_R}}$ due to correction algorithm:

$$= 100 \times \frac{\left\{\frac{\mathrm{CPM_L}}{\mathrm{CPM_R}} - \frac{\mathrm{CPM_L}}{\mathrm{CPM_R}} \frac{y_L^2}{y_R^2}\right\}}{\frac{\mathrm{CPM_L}}{\mathrm{CPM_R}}} = 100 \times \left\{1 - \frac{y_L^2}{y_R^2}\right\}$$

where $y_L = 13.2x + 0.7$

$y_R = 13.3x + 0.7$

$$\therefore \boxed{\%\Delta\left(\frac{\mathrm{ERPF_L}}{\mathrm{ERPF_R}}\right) = 100 \times 1 - \frac{(13.2x + 0.7)^2}{(13.3x + 0.7)^2}} \qquad (1)$$

For two extreme cases:

(a) Very obese: Weight 300 lb = 136.2 kg height 5′ = 152.4 cm

$$x = \frac{\text{weight}}{\text{height}} = \frac{136.2}{154.4} = 0.8937$$

$= 136.2$ kg; 152.4 cm

(b) Very thin: Weight 154 lbs = 70 kg height 6′6″ = 198.1 cm

$$x = 0.3533$$

Substituting in (1)

$$\text{For very obese case: } \%\Delta\left(\frac{\mathrm{ERPF_L}}{\mathrm{ERPF_R}}\right) = 1.4\%$$

$$\text{For very thin case: } \%\Delta\left(\frac{\mathrm{ERPF_L}}{\mathrm{ERPF_R}}\right) = 1.3\%$$