

Letter to the Editor

Heterotaxy and isomerism

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Sir,

We read with great interest the report from Ma et al,¹ in which they described their search for genetic mutations in the setting of so-called “heterotaxy”. The investigation of their patients in terms of genetic make-up is exemplary, but we wonder whether they are able to make meaningful conclusions without first stratifying their cohort of patients with regard to the arrangement of the atrial appendages, and without considering bronchial morphology. It is surprising to us that, in the light of the sophistication of their genetic analysis, they did not enquire with regard to these two crucial phenotypic features, more so as they defined heterotaxy on the basis of “segmental discordances of the thoraco-abdominal organs along the left-right axis”. We presume that, on this basis, they would have excluded all patients with complete mirror imagery, or so-called “situs inversus”, as such patients, of course, would not exhibit discordances in the arrangement of their thoracic and abdominal organs. It goes without saying that they would have excluded all patients with usual atrial arrangement, or so-called “situs solitus”. It is remarkable, therefore, that of their 47 patients included as having “heterotaxy”, only 10 were listed as having absence of the spleen and 5 as having multiple spleens. Should they not have determined the state of the spleen in the remaining 32 patients?

We are aware that analysis of atrial morphology in the setting of heterotaxy remains contentious, with some arguing that isomerism is no more than a “useful mnemonic”,² but it has been clearly shown that, when judged on the extent of the pectinate muscles, patients with heterotaxy can readily be stratified from the stance of the heart into subsets with isomerism of either the right or left atrial appendages.³ It is also the case that when each system of organs is analysed independently there is

no such thing as “situs ambiguus”. This latter fact is borne out by our recent experience when, at first sight, we were confronted with a patient having the potentially ambiguous combination of thoracic organs showing right isomerism, but with a mirror-imaged arrangement of the abdominal contents (Fig 1), including two right-sided splenules.



Figure 1.

The image shows the arrangement of the thoraco-abdominal organs as encountered during a recent autopsy at Mount Sinai Hospital in Toronto. At first sight, there is complete mirror imagery of the thoracic and abdominal organs, except that the liver is midline, suggesting that there could be so-called heterotaxy.

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Figure 2.

Further analysis of the thoracic organs had revealed that both lungs were trilobed, and examination of the bronchial tree showed obvious right isomerism, with both bronchuses being short and eparterial. As can also be seen, there was totally anomalous pulmonary venous connection, with the small vertical vein being traced to the left superior caval vein. Analysis of the heart revealed the bilateral presence of morphologically right atrial appendages. The correct diagnosis, therefore, was right isomerism, rather than mirror imagery.

Further examination, however, showed that the presumed splenules were composed of hepatic tissue, with analysis of the bronchial tree confirming the presence of right isomerism (Fig 2). Thus,

there was no ambiguity in the final diagnosis of right isomerism. Would not the analysis in the patients reported by Ma et al,¹ therefore, have been equally enhanced had the authors reported on bronchial arrangement, along with the morphology of the atrial appendages?

Yours faithfully,

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