

A case of situs inversus

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THE CASE is a 25 year old Chinese female, a staff nurse by profession. She had a full-term normal delivery. Her parents are not related to each other. She had pneumonia at the age of 6 months. She had a normal childhood with no other significant diseases. When about 13 years old she went for a routine medical examination and chest X-ray to join her school swimming club and was told that she had an abnormality in the chest, but she did not go to find out the exact nature of this abnormality. She holds a swimming instructor's certificate for life-saving. In 1968, before she went to England, a general practitioner in Kuala Lumpur gave her a letter saying that she was physically fit, but did not mention situs inversus. She had a complete medical examination and chest X-ray in England on joining her nursing school in Dec. 1968. The doctor then told her that her heart was on the right side. Then she went for a barium meal (the same month), but the result of this was not told to her. One year later she had influenza and was admitted to hospital and a chest X-ray was done. The doctor then told her that she had complete situs inversus with dextrocardia. In April 1971 she had German measles. She had allergic rhinitis and then in June 1971 she developed an acute attack of bronchial asthma and later in 1972 had a few more attacks. She also sprained her back. An ECG was taken in the University Hospital here in 1972. She has had no more attacks of asthma since she returned to Malaysia in 1973. She is happily married. In 1974 she gave birth to a full-term male baby; the delivery was normal.

She is allergic to sulfonamides - she develops urticaria. She is right-handed with no signs of being ambidextrous.

Physical Examination:

She is a normal female adult on appearance.
Pulse: 64/minute, regular
Blood pressure: 110/65 mm Hg.
Vision: mild myopia both eyes
Throat & teeth: NAD
Respiratory system: NAD
Heart: Heart sounds louder on the right than the left, loudest in the 5th right intercostal space. Apex beat is not well palpable.
Abdomen: Liver & spleen not palpable, abdomen soft.
Nervous system: NAD
Musculo-skeletal system: NAD
Fig. 1 is a photograph of the case.

Investigations:

Fig. 2, her chest X-ray, shows the heart to be a mirror - image of the normal. Lung fields are normal. Gas under the right dome of the diaphragm indicates that the abdominal viscera are also reversed. The left pulmonary arteries are prominent, perhaps due to poor positioning.

Several tracings were taken, some of which are shown in Figs. 3 & 4. Fig. 3 shows the ECG taken with the leads in the usual positions and shows dextrocardia. The rate is 64/minute and the rhythm is regular. It is interesting and logical to see that when the limb leads were laterally reversed (LL \leftrightarrow RL & LA \leftrightarrow RA) the resultant ECG looks almost normal (Fig. 4). Also, no left ventricular complex was found even in v7R, with the leads laterally reversed.



Fig. 1

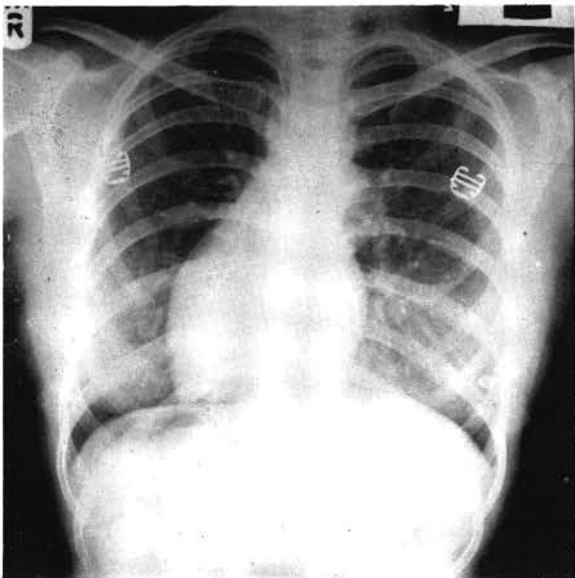


Fig. 2

Discussion:

Complete situs inversus viscerum is also known as situs inversus totalis, situs transversus and heterotaxia, and means lateral transposition of all the viscera, so that they are the mirror-image of the normal. (The normal position of the viscera is called situs solitus). In this article situs inversus always means complete situs inversus. Aristotle mentions it in animals and Marie de Medici, a queen of France, was said to have had it. One woman with situs inversus attempted suicide unsuccessfully by shooting herself in the normal location of the heart.

The incidence of situs inversus varies in different series, the highest being found in the Philippines (1:4000). In the Mayo Clinic, U.S.A., an incidence of 1:20,400 was found.

The establishment of situs inversus takes place in early cleavage of the fertilized ovum. The cause is unknown. Cockayne feels that situs inversus is inherited as an autosomal recessive gene. It may be familial; many cases have parents who are first cousins, and it occurs in both members of a pair of identical twins. It may be related to twinning, as experiments with frog and toad embryos suggest that injury to one side may induce reversal of symmetry. In human beings with situs inversus the heart is mainly on the right side, the stomach runs from right to left, the liver is mainly on the left, the caecum and appendix are on the left, the spleen on the right, etc. The asymmetrical blood vessels are also laterally reversed. Sometimes only the abdominal or only the thoracic organs may be reversed, i.e. there is incomplete situs inversus.

During disease pain may occur either on the side where the organ is or on the side where the organ should be. Faulty diagnosis may lead to a wrong operative approach.

Dextrocardia alone is much more common than situs inversus. Fig. 5 shows the normal heart and two types of dextrocardia. Situs inversus is compatible with normal life except in cases which have associated bronchiectasis and underdeveloped paranasal sinuses (the rare Kartagener syndrome). The incidence of cardiopathy in situs inversus hearts is not greater than normal.

There is no higher incidence of left-handedness in cases of situs inversus. Broca's area (area 44 or the motor speech area) is the area in the inferior frontal gyrus of the dominant cerebral hemisphere of a normal person. Theoretically it should be more often on the right in cases of situs inversus.

ECG with leads in usual positions

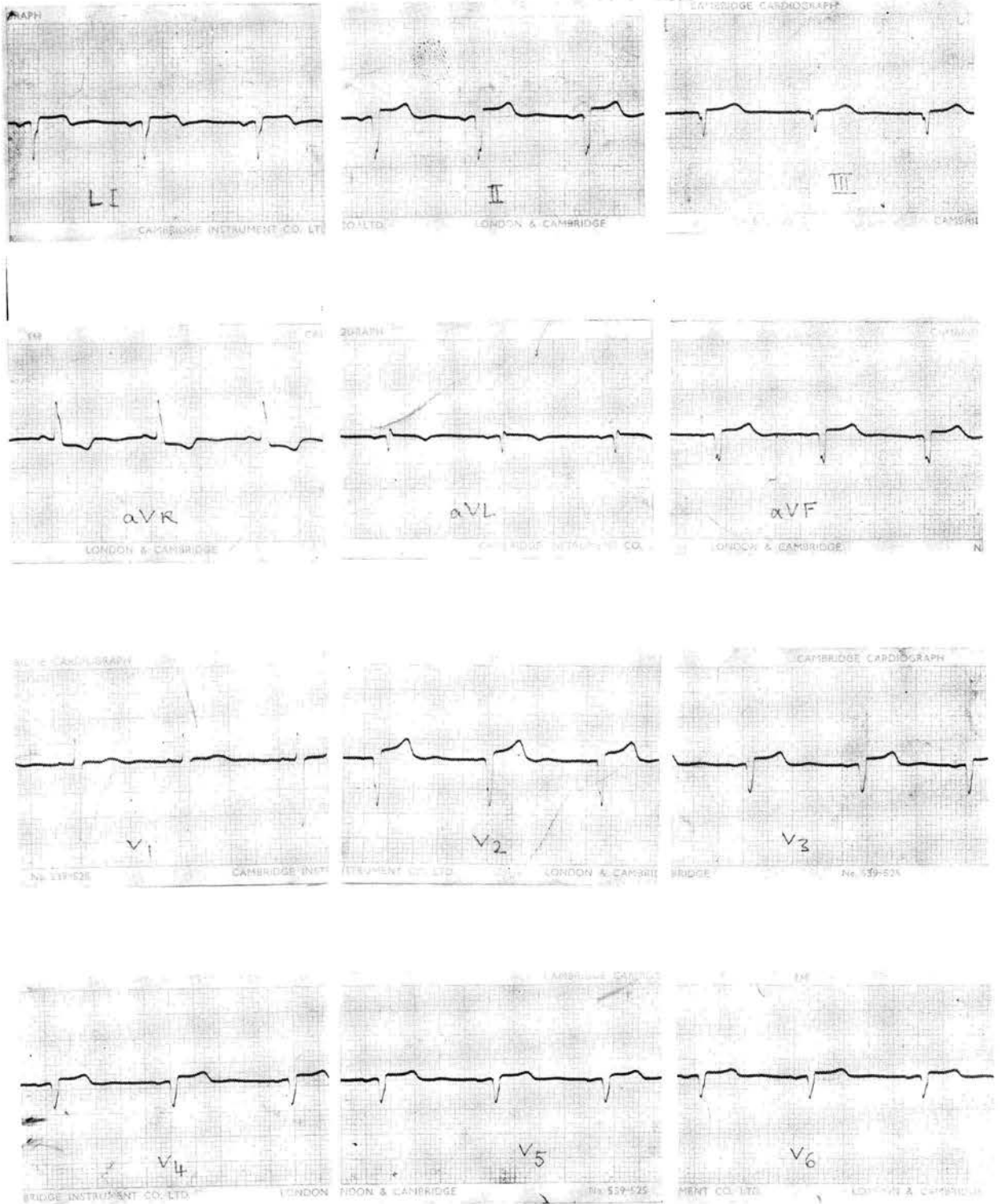
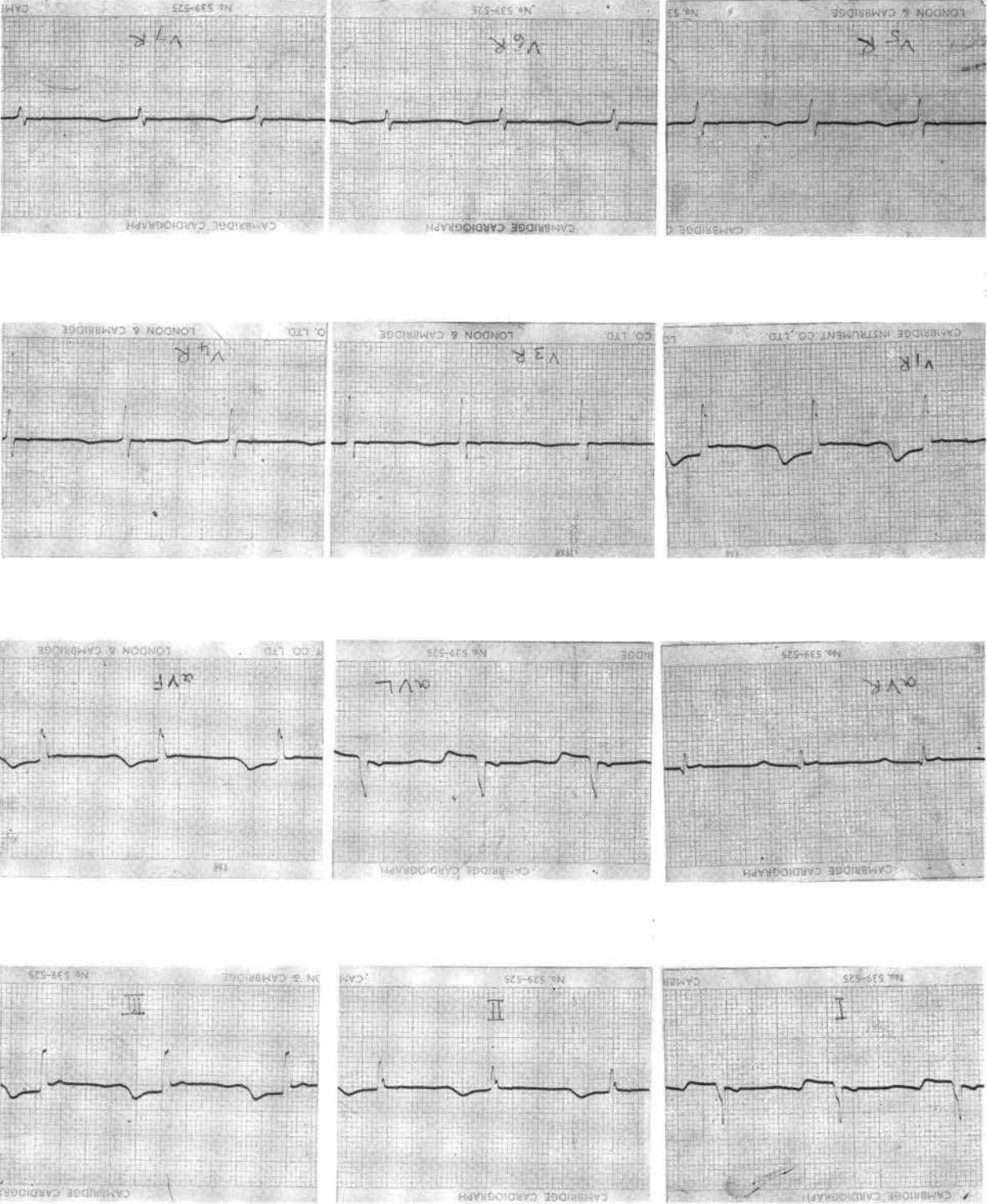


Fig. 3

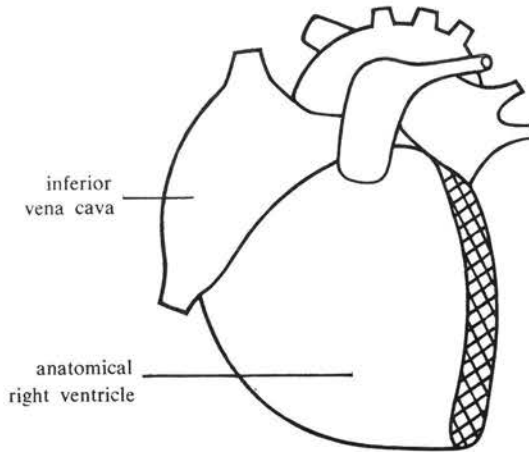
EKG with limb leads laterally reversed



N.B. V_2R has been deliberately omitted; it is similar to V_3R .

Fig. 4

Anterior View of Normal Heart



Dextroversion ← Dextrocardia → Situs Inversus Heart

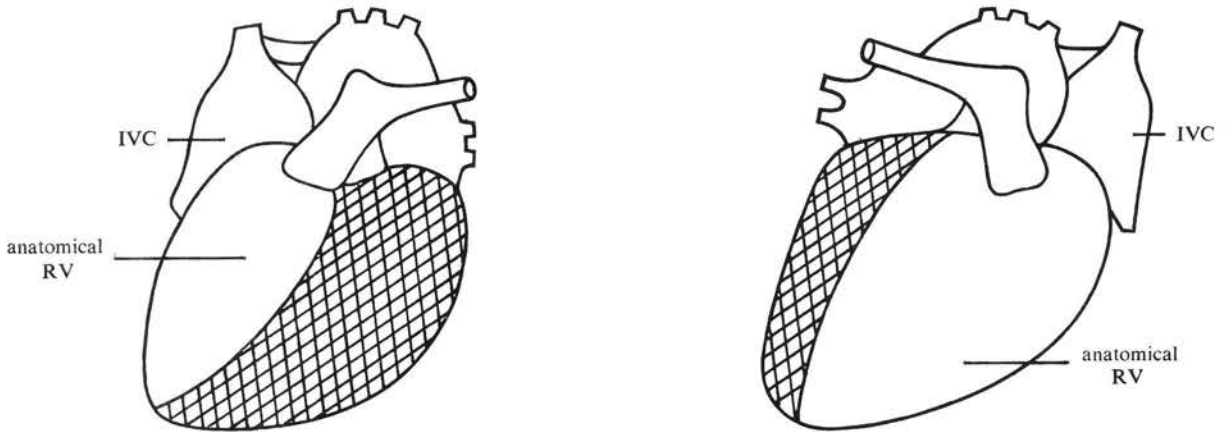


Fig. 5

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