Right atrial outlet atresia with straddling left atrioventricular valve

A form of double outlet atrium

EDUARDO OTERO COTO, RAFFAELE CALABRO, FEDERICO MARSICO,
JUAN S LOPEZ ARRANZ

From Ciudad Sanitaria "La Fe", Valencia, Spain; Ospedale Pausillipon, Napoli, Italy; and Ciudad Sanitaria "Virgen de Covadonga", Oviedo, Spain

SUMMARY We present three hearts showing right atrial outlet atresia with straddling left atrioventricular valve; clinical data of two of the patients are reported. For semantic and practical reasons we believe the terms tricuspid or mitral atresia should not be used in these cases, and atrial outlet atresia is preferable; for similar reasons we prefer to use straddling left or right atrioventricular valve. These anomalies represent an interesting form of double outlet atrium and diagnosis clinically may be possible if the existence of the anomaly is considered. Differentiation from common atrioventricular canal with atrial outlet atresia is important since total repair, which is possible for this last anomaly, does not seem feasible in cases like ours. Classifications of tricuspid atresia may have to be enlarged to include cases with double outlet from either ventricular chamber or anatomically corrected malposition. Characterisation of the right ventricular chamber is difficult; we believe that description of its morphology and the type and mode of its connections should be used.

Straddling atrioventricular valve is that condition in which either atrioventricular valve orifice provides entry to both ventricular chambers, and the valve in question has papillary or chordal attachments in both.¹ Double outlet atrium is that condition in which either the right or the left atrium empties into both ventricles, while the other atrium has no outlet unless there is an associated defect of the atrial septum.² Atrial outlet atresia, as implied from the preceding definition, is that condition in which either the right or left atrium has no outlet other than a defect of the atrial septum. This term is synonymous with the term atrial official atresia, proposed previously.³

The association of a straddling valve with atrial outlet atresia is an interesting anomaly infrequently described in the past. Straddling left atrioventricular valve with right atrial outlet atresia has been reported by Freedom *et al.*⁴ and Vlad⁵ in cases where the right ventricular chamber is placed to the right of the left ventricular chamber, and by Fragoyannis and Kardalinos⁶ and Tandon *et al.*⁷ in cases where there is a left-sided right ventricular chamber. The case described by Horiuchi *et al.*⁸ as

double outlet left atrium with complete atrioventricular canal and L-loop double outlet right ventricle may be compared with the latter. Straddling right atrioventricular valve with left atrial outlet atresia has been reported by Navarro-Lopez *et al.*,⁹ Liberthson *et al.*,¹ Tandon *et al.*,⁷ and Rosenquist¹⁰; some of these cases may be similar to those mentioned by Van Mierop.²

We report three patients showing straddling left atrioventricular valve with right atrial outlet atresia.

Case reports

CASE 1

This case has been previously included in a series of cases with straddling mitral valve.¹¹ No clinical data were available for review, but additional anatomical data are presented.

The heart showed atrial situs solitus and a left-sided cardiac apex. The right atrium was large and received both venae cavae and several coronary veins. A right atrioventricular valve was not found (Fig. 1a). The ventricular septum did not meet the atrial septum at the crux cordis but joined the

Received for publication 21 April 1980

posterior ventricular wall to the right of the atrial septum. The floor of the right atrium was placed above the posterior end of the ventricular septum with, therefore, no connection with the right ventricle. A patent, dilated, foramen ovale communicated with the left atrium, which received four pulmonary veins. A left atrioventricular valve

allowed direct communication of the left atrium with both ventricular chambers, with about 40 per cent of the valve orifice being placed above the right ventricular chamber and 60 per cent above the left ventricular chamber (Fig. 1b). This valve had four groups of papillary muscles, two of them being inserted into the left ventricular chamber and the

Fig. 1 Case 1. (a) Right atrial view, showing the fossa ovalis with a large patent foramen ovale (black arrow). There is no atrioventricular valve and the floor of this chamber (open arrow) is placed above the posterior end of the ventricular septum (absent connection). a, right atrial appendage; c, superior vena cava. (b) The left atrium (LA) and left ventricular chamber (LV) have been opened showing the mitral valve straddling (arrows) the anterior part of the septum and having two groups of papillary muscles into the left ventricular chamber. (c) The subpulmonary outflow tract has been opened. The straddling portion of the atrioventricular valve occupies the anterior part of the right ventricular chamber. Accessory valve tissue (arrows) contributes to the production of subpulmonary obstruction. Fibrous continuity between the pulmonary and atrioventricular valves is present. P, pulmonary artery. (d) The opened subaortic outflow tract shows the presence of a subaortic infundibulum (I). No right ventricular sinus was found, and papillary muscles of the straddling valve are seen in the anteroinferior part of this chamber, below the pulmonary artery origin. A, aorta.

other two into the right ventricular chamber. Some chordae tendineae were directly attached to the ventricular septum. The left ventricular chamber was posterior, inferior, and to the left, and fairly normal-sized though no great artery arose from it. The right ventricular chamber gave origin to both great arteries, with the aorta being directly to the right of the pulmonary artery. The aorta was supported by a muscular infundibulum (Fig. 1c), while the pulmonary artery showed fibrous continuity with the straddling valve (Fig. 1d). Subpulmonary stenosis was produced by some accessory valve tissue (fibrous tags). The ventricular septum showed a large, malalignment or infundibulo-ventricular type of defect (a clear muscular septum being interposed between the defect and the posterior ventricular wall), through which the atrioventricular valve straddled, entering the subpulmonary outflow tract. The aortic arch was left-sided and the coronary arteries showed the "rainfall" pattern.

CASE 2

This 5-month-old boy, born after an uncomplicated pregnancy, had dyspnoea on feeding and mild cyanosis. Physical examination showed underdevelopment (weight under centile 3 and height under centile 50). There was generalised cyanosis. Normal pulses were palpated in the four limbs. The liver was palpable 2 cm below the costal margin. On auscultation there was a pansystolic murmur, grade 2/6, in the third and fourth left intercostal spaces, followed by a single second sound.

The electrocardiogram showed sinus rhythm at 150 beats/min, left anterior hemiblock, $\bar{A}$ QRS = -75° , right atrial enlargement, and diphasic complexes across the precordial leads. The chest x-ray film showed slight cardiac enlargement with diminished pulmonary vascular markings and an absence of the pulmonary artery conus.

Cardiac catheterisation was performed through the right saphenous vein. Haemodynamic data are shown in the Table. The catheter reached the right atrium and crossed an atrial septal defect or patent foramen ovale to enter the left atrium and then a ventricle. No ventricle could be catheterised from the right atrium. The pulmonary artery could not

be entered. Right atrial contrast injection showed absent right atrioventricular connection. The contrast filled the left atrium and then a ventricular chamber. Originally it was thought that discordant ventriculoarterial connection was present, though the outlet chamber could not be adequately outlined. In retrospect it seems that there was a remnant of septum, which was not adequately seen in the lateral projection, with both vessels being connected to the anterior ventricular chamber. Soon afterwards the patient presented with atrioventricular dissociation and severe bradycardia, and death followed cardiac arrest.

Necropsy showed atrial situs solitus and a left-sided cardiac apex. The right atrium received both venae cavae and a large coronary sinus. A left superior vena cava drained into the coronary sinus. No atrioventricular valve was found in the right atrium, and the floor of this chamber was placed above the posterior wall of the right ventricular chamber (Fig. 2a). A multiperforated atrial septum allowed communication between both atria. The left atrium received four pulmonary veins. A large left atrioventricular valve was found to allow entry to both ventricular chambers (Fig. 2b), straddling over an anterior septal defect, with a well-developed muscular septum separating the posterior border of the septal defect from the posterior ventricular wall. The muscular septum reached the atrioventricular junction at the same level of the atrial septum (Fig. 2b and 2c). Both ventricular chambers were equally well developed, with the left ventricular chamber being posterior, inferior, and to the left of the right ventricular one. Two groups of papillary muscles were found in the left ventricular (Fig. 2c) and one in the right ventricular chamber. The atrioventricular valve was roughly equally placed above each ventricular chamber. A muscular band was found in the right ventricular chamber (Fig. 2d), going from the septum to the papillary muscle in this chamber, and seemed to separate two apical recesses. Both great arteries arose from the right ventricular chamber, the aorta being anterior and to the right of the pulmonary artery. There was fibrous continuity between the mitral and pulmonary valves (Fig. 2d). Severe pulmonary stenosis was present at both valvular and subvalvular levels and the pulmonary trunk was hypoplastic. The aortic arch was left-sided. A persistent ductus arteriosus and a rainfall coronary artery pattern were other features of this case.

CASE 3

This was a 20-day-old boy born after normal pregnancy and delivery. Shortly after birth he presented with pronounced dyspnoea and peripheral

Table Haemodynamic data in case 2

Chamber	Pressure	O ₂ saturation
Right atrium	$\bar{10}$	50%
Left atrium	$\bar{10}$	73%
Left ventricle	120/4-10	75%
Aorta	110/70	75%

oedema. Physical examination on admission showed jaundice, and the liver was palpable 5 cm below the costal margin. Pulses were weak in the arms and absent in the legs. There was a systolic murmur, grade 2/6, at the second left intercostal space, followed by a split second sound and a loud third sound with gallop rhythm.

Haematocrit was 48 per cent; calcium 6.4 mg/100 ml, and total bilirubin 170 μ mol/l. The electrocardiogram showed sinus rhythm at 160 beats/min, first degree atrioventricular block, $\bar{A}$ QRS = -10° , right atrial enlargement, and left ventricular predominance. The chest x-ray film showed cardiac

enlargement with increased pulmonary vascular tracings and perivascular oedema.

Antifailure treatment was started, with no benefit. Cardiac arrest followed progressive deterioration of his clinical status, before cardiac catheterisation could be performed.

Necropsy showed situs solitus of the atria with a left-sided cardiac apex. The right atrium was large and hypertrophic (Fig. 3a). Both venae cavae and the coronary sinus drained into it. The atrial septum was aneurysmally deformed and displaced to the left. A small patent foramen ovale was the only atrial septal defect. No atrioventricular valve was

Fig. 2 Case 2. (a) Right atrial view showing the multiperforated atrial septum (small arrows). No atrioventricular valve is seen and the floor of this chamber (open arrow) was placed above the posterior ventricular wall (absent connection). (b) Section of the left atrium (A), left ventricular wall (V), and the anterior part of the septum (S) shows the atrioventricular valve straddling (arrows) the anterior part of the septum. R, right ventricular chamber. (c) The left ventricular chamber (LV) has been opened, showing its typical anatomical characteristics and the presence of two papillary muscles. A well-developed posterior septum is seen (arrow) under the posterior straddling leaflet. (d) The right ventricular chamber has been opened. A muscular band (B) extends from the septum to the free wall, at the level of the attachment of the sectioned group of papillary muscles, separating two (anterior and posterior) apical recesses. There is severe subvalvular and valvular pulmonary stenosis, and fibrous continuity with the atrioventricular valve was present. The aorta is supported by a muscular infundibulum. No true ventricular sinus was found. AR, anterior apical recess. Arrow, subpulmonary outflow tract.

found in the right atrium, and the floor of this chamber was placed above the left ventricular chamber. The left atrium was large and received four pulmonary veins. The left atrioventricular valve entered both ventricular chambers (Fig. 3b), though only about 15 per cent of the valve orifice communicated with the right ventricular chamber. There were some chordal attachments to the rim of the septum. Two groups of papillary muscles were present in the left ventricular and one hypoplastic group in the right ventricular chamber. Mobility of the valve was restricted by the septal attachments making severe regurgitation probable. While the left ventricular chamber was large, the right ventricular chamber was much smaller (Fig. 3c), being anterior, superior, and to the left of the main chamber, and closely related to the left atrium. A septal defect, through which the atrioventricular valve straddled, was found in the posterior part of the ventricular septum (Fig. 3d). This septum joined the ventricular free wall far to the left of the atrial septum. The pulmonary artery arose from the left ventricular chamber, in fibrous continuity with the atrioventricular valve. The aorta was anterior and to the left of the pulmonary artery, supported by a muscular infundibulum placed above the right ventricular chamber. There was hypoplasia of the aortic isthmus and a large persistent ductus arteriosus. The aortic arch was left-sided. There was an atypical rainfall coronary artery pattern.

Discussion

Cases 1 and 2 show a right-sided right ventricular chamber and a regular, or non-inverted, type of ventricular organisation.¹² In these cases the left (straddling) atrioventricular valve might be considered a mitral valve, and these cases could be described as tricuspid atresia with mitral straddling. In case 3 the right ventricular chamber is left-sided and shows an apparently inverted pattern of organisation; this case, therefore, might be described as mitral atresia with tricuspid straddling. We feel, however, that these terms may not be adequate in this particular context, since the morphology of the valves is atypical in these cases and they cannot be identified with certainty, as happens with other cases showing univentricular hearts.¹³ In addition, variations in position make it difficult to say the type of looping present in cases with univentricular heart,^{13 14} and wrong conclusions may be drawn by considering this fact alone. Finally, as noted below, we believe that similar conditions exist with a common atrioventricular canal, and it seems to us semantically inaccurate to talk about tricuspid or mitral valves when there

is a common atrioventricular valve. In clinical terms these cases show similar features, with variations depending on the degree of pulmonary obstruction, and similar methods of surgical treatment may be possible too. We prefer, therefore, not to establish such differentiation and to use the term straddling left atrioventricular valve with right atrial outlet atresia to designate cases such as those we present.

Clinical diagnosis of these anomalies (by a combination of echocardiographic and angiocardio-graphic data) seems possible, though it was not made in our cases, provided that the existence of these anomalies is known. The presence of double-outlet outlet chamber in cases with right atrial outlet atresia should suggest the possible association of straddling left atrioventricular valve.

Although significant obstruction at atrial septal level is not frequent in patients with obligatory shunts across the foramen ovale,¹⁵ there are a number of patients (our case 3 and others described by many authors) who present obvious obstruction at this level. The association of aneurysmal displacement of the atrial septum may be a clue to the diagnosis of the presence of such obstruction, which is easily shown by 2-D echocardiography, and this may be important in deciding on treatment.

Straddling atrioventricular valve with atrial outlet atresia should be differentiated from common atrioventricular canal with double outlet atrium, a condition first mentioned by Van Mierop² and reported by Horiuchi *et al.*⁸ In normal hearts the plane of the atrial septum forms an angle of about 15 degrees with the ventricular septum.¹⁶ Important alterations of this relation, with a leftwards deviation of the atrial septum in relation to the ventricular septum, have been previously reported in cases with common atrioventricular canal.^{17 18} In a review of 273 hearts from several centres showing different types of common atrioventricular canal one of us (EOC) has found a complete spectrum of relative laevoposition of the atrial septum in relation to the ventricular septum. Four cases had extreme laevoposition of the atrial septum, resulting in the presence of double outlet right atrium. The only outlet for the left atrium was an atrial septal defect. Such hearts, apparently similar to some cases previously described as straddling right atrioventricular valve with left atrial outlet atresia,^{9 10} had two well-developed ventricles. We have not seen a similar case showing double outlet left atrium with normally positioned ventricles, nor are we aware of a published report of such a case. A case reported by Horiuchi *et al.*,⁸ however, showed double outlet left atrium with left-sided right ventricle and right-sided left ventricle, and was successfully corrected.

Differentiation between cases of double outlet atrium and common atrioventricular canal and cases such as those we report is not only of speculative interest, either anatomical or embryological, but also has surgical interest. In cases with a common atrioventricular canal the presence of two adequately-sized ventricles may allow repair either by enlarging the atrial septal defect or by resecting the atrial septum, followed by repair of the atrioven-

tricular canal anomaly plus septation of the atria; care being taken to avoid leaving anomalous pulmonary venous drainage. In cases with straddling left atrioventricular valve like ours, repair does not seem feasible at the moment and a Fontan-like operation is the only radical surgical treatment for these patients. The distal anastomosis of the conduit has to be made to the pulmonary artery, since the right ventricular chamber cannot be used

Fig. 3 Case 3. (a) The right atrium is large and hypertrophic. The interatrial septum (S) was aneurysmally herniated to the left and a patent foramen ovale (arrow) was the only interatrial communication. No atrioventricular valve was seen and a clear dimple was not found. A, atrial appendage. (b) The left atrium (LA) and left ventricular chamber (LV) have been opened. The aneurysm of the atrial septum (A) is clearly shown. The atrioventricular valve straddles (arrows) the sectioned ventricular septum (S), with some chordal attachments to the septal rim. Most of the valve orifice enters the main, left ventricular chamber, and only about 15 per cent enters the right ventricular chamber. (c) and (d) Though the rudimentary chamber is left-sided, it is photographed in such a way to illustrate its morphology that it appears to be to the right and any such impression is artefactual. (c) The small right ventricular chamber (R) gave rise to the aorta and was placed anterior, superior, and to the left of the main chamber (L). The pulmonary artery (P) arose from the main chamber. The anterior part of the septal defect (arrow), not related to the atrioventricular valve, is shown. A, aorta. (d) The atrioventricular valve entered the right ventricular chamber at its most posterior part. A group of hypoplastic papillary muscles (arrow) was found in this chamber and received several chordae tendineae. The left ventricular chamber has two groups of papillary muscles. Fibrous continuity between pulmonary and atrioventricular valves is restricted to a small area. P, pulmonary artery; A, aorta.

as an ejecting chamber because it forms the sub-aortic outflow tract. Placement of a valve prosthesis in cases with severe regurgitation of the straddling valve requires evaluation of the size of the septal defect and appropriate resection if necessary.

CLASSIFICATION AND TERMINOLOGY

Commonly used classifications of tricuspid atresia,^{5 19} divide this anomaly into groups with or without transposition, with further subdivisions according to the type of transposition and the presence, and degree, or absence of pulmonary outflow tract obstruction. Our cases 1 and 2 together with those reported by others⁴⁻⁶ prove that double outlet from the right ventricular chamber is another possible ventriculoarterial connection in patients with right atrial outlet atresia. Double outlet left ventricular chamber and other types of ventriculoarterial connection have been described by a number of authors.^{3 20}

The cases presented are significant, as previously noted.⁴ They show that a ventricular chamber whose valve is atretic and, therefore, should lack an inlet portion, may receive part of the other atrioventricular valve. In cases like ours (1 and 2) this valve clearly enters the outflow tract of the right ventricular chamber. Should this chamber be called a ventricle or an outlet chamber? We do not wish to argue about definitions and would therefore describe the morphology of the ventricular chambers as right or left (a fact which is determined by the trabeculated portion, independently of the connections) and describe the type and mode of connections in the manner previously proposed by Tynan *et al.*²¹

In cases 1 and 2 the floor of the right atrium was placed above the posterior part of the ventricular septum and the posterior ventricular wall. Therefore no potential connection existed between the right atrium and a ventricular chamber, and this can be adequately designated as absent right atrioventricular connection, as previously suggested by others.¹³ In case 3 the floor of the right atrium was placed above the left ventricular cavity. Though no remnant of a right atrioventricular valve was observed in this case and the description absent atrioventricular connection may, therefore, be correctly used, the direct relation of the right atrium to the left ventricular cavity suggesting the presence of a potential connection²² of double inlet left ventricular type may be considered too.

Our cases show an unusual type of double outlet atrium. As defined by Van Mierop,² this is a condition in which either the right or the left atrium empties into both ventricles. That condition can exist with a common atrioventricular valve,^{2 8} a

straddling atrioventricular valve,^{4-7 9-11} or two separate atrioventricular valves entering separate ventricles.²³ This is seen as a separate type of atrioventricular connection, with particular surgical implications, whose real existence should be emphasised. It must be noted that the other atrium shows outlet atresia and the blood has to cross an atrial septal defect to reach the ventricles; such a septal defect, as in cases we have seen, may be either a patent foramen ovale, an ostium secundum, a sinuatrial, or an ostium primum defect.

References

- 1 Liberthson RR, Paul MH, Muster AJ, Arcilla RA, Eckner FAO, Lev M. Straddling and displaced atrioventricular orifices and valves with primitive ventricles. *Circulation* 1971; **43**: 213-26.
- 2 Van Mierop LHS. Pathology and pathogenesis of endocardial cushion defects: Surgical implications. In: Davila JC, ed. *Second Henry Ford Hospital international symposium on cardiac surgery*. New York: Appleton-Century-Crofts, 1977: 201-7.
- 3 Anderson RH, Wilkinson JL, Gerlis LM, Smith A, Becker AE. Atresia of the right atrioventricular orifice. *Br Heart J* 1977; **39**: 414-28.
- 4 Freedom RM, Bini R, Dische R, Rowe RD. The straddling mitral valve: morphological observations and clinical implications. *Eur J Cardiol* 1978; **8**: 27-50.
- 5 Vlad P. Tricuspid atresia. In: Keith JD, Rowe RD, Vlad P, eds. *Heart disease in infancy and childhood*. 3rd ed. New York: Macmillan, 1978: 518-41.
- 6 Fragoyannis S, Kardalinos A. Transposition of the great vessels, both arising from the left ventricle (juxtaposition of pulmonary artery). Tricuspid atresia, atrial septal defect and ventricular septal defect. *Am J Cardiol* 1962; **10**: 601-604.
- 7 Tandon RM, Becker AE, Moller JH, Edwards JE. Double inlet left ventricle. Straddling tricuspid valve. *Br Heart J* 1974; **36**: 747-59.
- 8 Horiuchi T, Saji K, Osuka Y, Sato K, Okada Y. Successful correction of double outlet left atrium associated with complete atrioventricular canal and l-loop double outlet right ventricle with stenosis of the pulmonary artery. *J Cardiovasc Surg (Torino)* 1976; **17**: 157-61.
- 9 Navarro-Lopez F, Marin Garcia J, Zomeño M, Llorian ARC. Mitral atresia and occlusive left atrial thrombus. A case with 11 years of survival. *Br Heart J* 1969; **31**: 649-52.
- 10 Rosenquist GC. Overriding right atrioventricular valve in association with mitral atresia. *Am Heart J* 1974; **87**: 26-32.
- 11 Otero Coto E, Quero Jimenez M, Cabrera A, Calabro R, Marsico F, Deverall PB. Straddling mitral valve. To be published.
- 12 Van Praagh R, Weinburg PM, Van Praagh S. Malposition of the heart. In: Moss AJ, Adams FH, Emmanouilides GC, eds. *Heart disease in infants*,

- children and adolescents. Baltimore: Williams and Wilkins, 1977: 394-417.
- 13 Anderson RH, Wilkinson JL, Macartney FJ, et al. Classification and terminology of primitive ventricle. In: Anderson RH, Shinebourne EA, eds. *Paediatric cardiology 1977*. Edinburgh: Churchill Livingstone, 1978: 311-22.
 - 14 Macartney FJ, Partridge JB, Scott O, Deverall PB. Common or single ventricle: an angiocardiographic and hemodynamic study of 42 patients. *Circulation* 1976; **53**: 543-54.
 - 15 Gersony WM. Discussion of balloon septostomy and preoperative care. In: Godman MJ, Marquis RM eds. *Paediatric cardiology*, vol 2. *Heart disease in the newborn*. Edinburgh: Churchill Livingstone, 1979: 483.
 - 16 Van Praagh R, Ongley PA, Swan HJC. Anatomic types of single or common ventricle in man. Morphologic and geometric aspects of 60 necropsied cases. *Am J Cardiol* 1964; **13**: 367-86.
 - 17 Yokoyama M, Ando M, Takao A, Sakakibara S. The location of the coronary sinus orifice in endocardial cushion defects. *Am Heart J* 1973; **85**: 302-7.
 - 18 Ugarte M, de Salamanca FE, Quero M. Endocardial cushion defects. *Br Heart J* 1976; **38**: 674-82.
 - 19 Tandon R, Edwards JE. Tricuspid atresia. A re-evaluation and classification. *J Thorac Cardiovasc Surg* 1974; **67**: 530-42.
 - 20 Quero-Jiménez M, Maitre Azcárate MJ, Alvarez Bejarano H, Vázquez Martul E. Tricuspid atresia, an anatomical study of seventeen cases. *Eur J Cardiol* 1975; **3**: 337-48.
 - 21 Tynan MJ, Becker AE, Macartney FJ, Quero Jiménez M, Shinebourne EA, Anderson RH. Nomenclature and classification of congenital heart disease. *Br Heart J* 1979; **41**: 544-53.
 - 22 Shinebourne EA, Macartney FJ, Anderson RH. Sequential chamber localization: logical approach to diagnosis in congenital heart disease. *Br Heart J* 1976; **38**: 327-40.
 - 23 Utley JR, Noonan JA, Walters LR, Frist RA. Anomalous position of atrial septum with anomalous pulmonary and systemic venous drainage. Correction including ligation of persistent left superior vena cava. *J Thorac Cardiovasc Surg* 1974; **67**: 730-2.

Requests for reprints to Dr Eduardo Otero Coto, Servicio de Cirugía Cardiovascular, Ciudad Sanitaria "La Fe", Valencia 9, Spain.