Interventricular Communications of the Child: Retrospective Study of 293 Cases at the Dakar Chu

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Introduction
Interventricular communications (IVC) are non-cyanogenic congenital heart defects characterized by dehiscence of the interventricular septum. It represents 20 to 30% of congenital heart diseases. Our objectives were to determine the hospital frequency of isolated IVC, to describe the clinical aspects, to assess medical and surgical management and to assess the prognosis. It is a retrospective descriptive and transversal study. All patients with isolated IVC aged 0 to 15 years were included. Sphinx plus2 software was used for database design and analysis. We collected 293 files, a prevalence of 44 per 1000. The average age at the time of diagnosis was 16 months. The sex ratio was 1.02. Recurrent infections accounted for 65.9%. Parental consanguinity was found in 35.8% of cases. Heart failure was noted in 7.5% of the cases, weight loss in 48.1%. Cardiomegaly was noted in 74.1% of cases with 54.9% of pulmonary hypervascularization. Perimembranous IVC was the most frequent with 84.6%. Large IVC represented 62.5% and multiple IVC 8.2%. Pulmonary arterial hypertension (PAH) was present in 58% of cases. Diuretics were prescribed in 76.5% of cases. Fifteen (15) catheterizations were performed, i.e. 5.1%. A complete cure was carried out in 20.1% of the cases. IVC are frequent, serious due to the repercussions, especially in the lungs. Surgical management of impacted forms should be improved.

Keywords: Interventricular Communication; Ultrasound; Child; Dakar.

Summary
Interventricular communications (IVC) are non-cyanogenic congenital heart diseases characterized by dehiscence of the interventricular septum. It represents 20 to 30% of congenital heart diseases. Our objectives were to determine the hospital frequency of isolated IVC, to describe the clinical aspects, to assess medical and surgical management and to assess the prognosis. It is a retrospective descriptive and transversal study. All patients with isolated IVC aged 0 to 15 years were included. Sphinx plus2 software was used for database design and analysis. We collected 293 files, a prevalence of 44 per 1000. The average age at the time of diagnosis was 16 months. The sex ratio was 1.02. Recurrent infections accounted for 65.9%. Parental consanguinity was found in 35.8% of cases. Heart failure was noted in 7.5% of the cases, weight loss in 48.1%. Cardiomegaly was noted in 74.1% of cases with 54.9% of pulmonary hypervascularization. Perimembranous IVC was the most frequent with 84.6%. Large IVC represented 62.5% and multiple IVC 8.2%. Pulmonary arterial hypertension (PAH) was present in 58% of cases. Diuretics were prescribed in 76.5% of cases. Fifteen (15) catheterizations were performed, i.e. 5.1%. A complete cure was carried out in 20.1% of the cases. IVC are frequent, serious due to the repercussions, especially in the lungs. Surgical management of impacted forms should be improved.

Methods
It is a retrospective descriptive and transversal study performed at the National Pediatrics Hospital Center Albert Royer, in the
thoracic cardiovascular surgery department and at the cardio-
pediatric center; over a period from January 2010 to December
2017. The children aged 15 years or less, carrying IVC, confirmed
by cardiac Doppler ultrasound (Philips Sonos 7500 and Acuson
S2000TM) were included. The associated diagnoses of Down’s
syndrome, Edwards syndrome, Noonan syndrome and Pierre
Robin syndrome were based essentially on the phenotypic aspects
(the karyotypes could not be performed). Data were collected from
patient records as well as hospital records. Sociodemographic
data, clinical and therapeutic summaries, the socio-economic
level based on the parents’ professional activity as well as the data in
the files. A survey sheet was used to support the data. Sphinx plus2
software was used for database design and data analysis. The text
was entered using Microsoft Word 2016 software.

Results

Our study identified 293 cases, a prevalence of 25% and 44 per
1000 cardiological consultations. We noted a sex ratio of 1:0.2.
The average age was 29 months with extremes of 1 day to 180
months (15 years) and the median of 13 months. The mean age of
the children at the time of the diagnosis of the IVC was 16 months
with extremes 0 to 168 months (14 years) and the median of 7
months (Figure 1). The antenatal diagnosis of IVC was made in
5 patients. A delay in psychomotor development was observed at
19.1% (n = 56). Most patients had experienced repeated episodes of
otolaryngology and lung infections (Table I). The Socio-economic
Level of 173 families was considered low, in 59%. We had found
a history of heart disease including 3 cases of CIV. The average
age of the mothers was 29 years with extremes of 16 and 44 years.
The concept of inbreeding was present in 35.8% with 13.3%
for the 1st degree and 16% for the 2nd degree. Forty-two (42)
children had down syndrome (14.3%) and two (2) had Edwards
syndrome (T18). There were also 3 cases of Noonan syndrome
and 1 case of Pierre-Robin syndrome. In our study, 57.7% (n =
169) of patients were referred. 60.1% of the children were seen
in consultation for follow-up. The reasons for hospitalizations
were dominated by infections with 27, 9% of the population. In
the first line were found pulmonary infections, which represented
23.5% with a predominance of cases of bronchiolitis. The rate of
cardiac decompensation was 8.5% (Table II). The mean weight
at the time of the consultation was 9.9 kg with extremes of 2 kg
and 64 kg. All of the patients in the group had a VIC murmur of
varying intensity and other manifestations such as heart failure,
weight-delay, respiratory distress, chest deformation. The
cholesterol showed cardiomegal in 219 children (74.7%).
 Pulmonary hypertension was present at 54.9% and
hypovascularization at 1.8%. The average size of the defect was
8.68 mm with extremes of 2.3 and 19 mm (Table III). An inversion
of the shunt was found in 3 patients. The average Trans ventricular
gradient was 42 mmHg. The hemodynamic impact was dominated
by dilation of the cavities with 35.5% for the left cavities and 5.8%
for the right and bilateral cavities in 10.9%. We also had an impact
on the pulmonary artery with dilation in 20.8%. Stenosis was
present in 16.4% of cases. Pulmonary arterial hypertension (PAH)
accounted for 157 cases or 53.6% of our population. Management
was mainly medical dominated by prescriptions for diuretics and
AEC inhibitor; however, there were 15 cases of catheterization
and 59 cases of complete cures (Table IV). In our series, 36.2%
of children were lost to follow-up compared to 59.4% who were
regularly followed up. Five cases of death (1, 7%) were found. The
main cause was cardiac decompensation.

Table I: Distribution according to postnatal history

<table>
<thead>
<tr>
<th>Concept</th>
<th>Numbers</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating difficulties concept</td>
<td>104</td>
<td>35.5</td>
</tr>
<tr>
<td>Dyspnea concept</td>
<td>216</td>
<td>73.7</td>
</tr>
<tr>
<td>Concept of repeated infection</td>
<td>193</td>
<td>65.9</td>
</tr>
</tbody>
</table>

Table II: Summary of the reasons for consultation / hospitalization

<table>
<thead>
<tr>
<th>Reason for consultations / hospitalisation</th>
<th>Number cited</th>
<th>Frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart monitoring</td>
<td>176</td>
<td>60.1</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>103</td>
<td>35.2</td>
</tr>
<tr>
<td>Severe anemia</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Infectious syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>2</td>
<td>0.7</td>
</tr>
<tr>
<td>Bronchiolitis</td>
<td>44</td>
<td>15</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>25</td>
<td>8.5</td>
</tr>
<tr>
<td>Endocarditis</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Febrile gastroenteritis</td>
<td>8</td>
<td>2.7</td>
</tr>
<tr>
<td>Decompensated heart disease</td>
<td>25</td>
<td>8.5</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Ingestion of caustic products</td>
<td>1</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Table III: Distribution of IVC by seat

<table>
<thead>
<tr>
<th>IVC Headquarters</th>
<th>Number cited</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perimembranuse</td>
<td>248</td>
<td>84.6</td>
</tr>
<tr>
<td>Trabeculated</td>
<td>23</td>
<td>7.8</td>
</tr>
<tr>
<td>Admission</td>
<td>21</td>
<td>7.2</td>
</tr>
<tr>
<td>Infundibular</td>
<td>11</td>
<td>3.8</td>
</tr>
<tr>
<td>Total observation</td>
<td>293</td>
<td>100</td>
</tr>
</tbody>
</table>
Currently, the chest X-ray is an integral part of the non-invasive management. Diuretics were more prone to nutritional disorders and weight loss [15]. Yilmaz G. and Bonow. Reported that children with heart disease are more likely to develop cyanosis [16]. Progressive evolution towards fixed pulmonary hypertension. The appearance of cyanosis reflects an inversion of the shunt and the state of the pulmonary vascularization. The sensitivity and specificity of the radiography are considered insufficient to allow the detection of heart disease in the newborn; as well as the electrocardiography [16]. From an ultrasound perspective, the predominance of perimembranous IVC was consistent with the results of many studies [2]. In the same vein, Eroglu found the majority against 21.7% of trabeculated IVC [17]. Large IVC (>7mm) were also more common in the Diop study [10]. The left cavities were dilated because they are the receiving rooms of the shunt. Other authors found results that overlap with our analysis. Bendriss found an 86% GD shunt, with 82% left cavitary dilatation [7]. Abdellaooui reported 11.3% cavity dilatation with left dominance [3]. Contrary to these results, Menta and Diop AK found a predominance of the dilation of the right cavities [2, 10].

Table IV: distribution according to medical and surgical management

<table>
<thead>
<tr>
<th>Medical treatment</th>
<th>Surgical treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics 76.5% (n = 224)</td>
<td>Strapping 4.4% (n = 13)</td>
</tr>
<tr>
<td>Digoxin 20.8% (n = 61)</td>
<td>Cure 20.1% (n = 59)</td>
</tr>
<tr>
<td>AEC inhibitor 39.2% (n = 115)</td>
<td>Out of the country 14%</td>
</tr>
<tr>
<td>Catheterization 5.1% (n = 15)</td>
<td>In the country 6.1%</td>
</tr>
</tbody>
</table>

Discussion

IVC is the most common congenital heart disease. The world average varies between 25-30% [1]. It is all the higher as the country has technical means adapted to its screening. In our cohort, the average age of the patients can be compared with those of Menta and al. who found an average of between 29 and 30 months [2, 3]. In Morocco, study reported discovery 44% in infants under 1 year of age and 31% in newborns [4]. This predominance in infants has also been reported by other authors such as G. Kinda [5]. This diagnosis remains late compared to developed countries, which have better diagnostic tools. Indeed, in these countries, the trend is towards prenatal diagnosis. Thus, Fang F. reported an incidence of 10% in China [6]. There appears to be a moderate increase in risk in children whose mothers are over 35 years of age. Some authors like Buchon and al. found that the risk was increased when the maternal age was over 30 years and would be 5.6% in women over 40 years old [7]. Conversely, Briard and al. found no correlation between maternal age and the occurrence of malformation, except in trisomy 21 [8]. Morales estimated that 14-27% of IVC cases are associated with Down syndrome [9]. The association Down syndrome and congenital heart disease is noted in several studies [10, 11]. The concept of consanguinity was found in several Senegalese studies including that of Léye and al. who found a high inbreeding rate with 92.7%. Shieh reported a more increased risk for marriages between first cousins first degree (20%) especially for heart disease associated with chromosomal diseases [12, 13]. Most often, IVC are revealed by a heart murmur, unexplained hypotrophy, feeding difficulties, respiratory distress during repeated upper airway and tracheobronchial infections. Our patients who had a history of eating difficulties represented 35.5% against 13% in the series of Benbahi [4]. The hospital prevalence of heart failure from the Kamdem series was 3.1% [14]. He also found a history of infection in 12.5% of his patients. Intra-hospital series in Casablanca reported 51% of bronchiolitis cases [4]. The functional manifestations and physical signs depend on the size of the shunt and the state of pulmonary vascular resistance. In Cameroon, Kamdem’s work reported the same symptomatology [5]. Other physical signs were found such as cyanosis, thoracic deformation and digital hipopigmentation. The appearance of cyanosis reflects an inversion of the shunt and the progressive evolution towards fixed pulmonary hypertension. Yilmaz G. and Bonow. Reported that children with heart disease were more prone to nutritional disorders and weight loss [15]. Currently, the chest X-ray is an integral part of the non-invasive diagnostic approach to congenital heart disease. Indeed, it is an excellent indicator of the morphology of the large vessels and the state of the pulmonary vascularization. The sensitivity and specificity of the radiography are considered insufficient to allow the detection of heart disease in the newborn; as well as the electrocardiography [16]. From an ultrasound perspective, the predominance of perimembranous IVC was consistent with the results of many studies [2]. In the same vein, Eroglu found the majority against 21.7% of trabeculated IVC [17]. Large IVC (>7mm) were also more common in the Diop study [10]. The left cavities were dilated because they are the receiving rooms of the shunt. Other authors found results that overlap with our analysis. Bendriss found an 86% GD shunt, with 82% left cavitary dilatation [7]. Abdellaooui reported 11.3% cavity dilatation with left dominance [3]. Contrary to these results, Menta and Diop AK found a predominance of the dilation of the right cavities [2, 10].

Conclusion

IVC is a common congenital heart disease. It is serious because of its repercussions especially pulmonary. Surgical management of impacted forms should be improved.

References


