



**Fig. 2.** Chest X-ray showing clearance of the pericardial halo image.

**Daniela María Bianchi Pintos, Hugo Bergoglio,  
Juan José Dours, Mario Agarzúa,  
Carlos Vignau, Sebastián Polo**  
Hospital Municipal de Azul Dr. Ángel Pintos - Amado Diab 270,  
B7300 Azul, Buenos Aires  
Dr. Mario Agarzúa – Email: [cardiocedema@gmail.com](mailto:cardiocedema@gmail.com)

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## Survey of Pregnant Women with Serological Diagnosis of Chagas Disease and its Association with Neonates

Congenital Chagas disease is the vertical transmission of *Trypanosoma Cruzi* from mother to child that can occur during pregnancy or childbirth. Its incidence in Argentina is 7%, and positive diagnosis of Chagas disease in pregnancy is around 2%, according to statistics of pregnant women attended in our Obstetrics Service. Since the enactment of National Law No. 26,281 in 2007 on the prevention and control of Chagas disease, which requires all pregnant women to undergo serology for Chagas, the diagnosis of the disease in neonates has simultaneously increased. (1) Given that congenital Chagas disease corresponds to an acute stage of the disease in which the parasite is in the blood, there are medicines to cure it.

The purpose of this study was to analyze Chagas detection data in newborns for their treatment and healing, and in pregnant women to carry out secondary prevention in women of childbearing age.

A retrospective, descriptive, statistical analysis of mothers from the Obstetrics Service of Hospital Mi Pueblo in Florencio Varela, Buenos Aires, was carried out between 2013 and 2018. The total number of pregnant women was divided by year into the following groups based on the results of the Chagas test: positive, negative, not tested, and no data. In addition, the number of Chagas-positive neonates in relation to Chagas-positive mothers was collected through the Epidemiological Record of the Chagas Disease Control Program, belonging to the Argentine Chagas Network. (2) Indirect hemagglutination assay (IHA) and ELISA were the serological techniques used in adults, and the modified Strout method was used in neonates. (3) Strout's method consists of collecting three serial blood samples from the neonate in the first ten days of life: the first one from the umbilical cord, and the other two from peripheral blood with anticoagulant as the volume collected is small. After blood sedimentation, different layers are found in the test tube: an upper layer of plasma, an intermediate thin layer of white blood cells, and a bottom layer of red blood cells. The intermediate layer shows the *Trypanosoma Cruzi*, since it has the same specific weight as white blood cells. Patients who are negative to the modified Strout method are diagnosed again eight months later with the usual serological reactions.

Table 1 summarizes findings in pregnant women and neonates based on the results of the Chagas test. The percentage of Chagas-positive mothers out of the total number of pregnant women was 1.14% throughout the period, and varied between 0.82% and 1.56% depending on the year considered. The percentage of mothers not tested for Chagas disease out of the total number of pregnant women varied between 13.5% and 24.1% depending on the year considered. Five cases

**Table 1.** Statistical summary of pregnant women and neonates based on the results of the Chagas test.

YEAR	Total number of mothers	Positive for Chagas	Negative for Chagas	Not tested for Chagas	No data	Chagas-positive neonates
2013	4,479	70 (1.6%)	3434 (76.7%)	879 (19.6%)	96 (2.2%)	1 (1.4%)
2014	5,587	46 (0.8%)	4029 (72.1%)	1405 (24.1%)	107 (1.9%)	1 (2.2%)
2015	5,737	70 (1.2%)	4634 (80.8%)	994 (17.3%)	39 (0.7%)	1 (1.4%)
2016	5,245	54 (1.0%)	4440 (84.7%)	708 (13.5%)	43 (0.8%)	1 (1.9%) *
2017	5,207	63 (1.2%)	4395 (84.4%)	734 (14.1%)	15 (0.3%)	0 (0.0%)
2018	5,202	55 (1.1%)	4369 (84.0%)	755 (14.5%)	3 (0.1%)	1 (0.1%) †

\*Chagas was detected at 8 months of age, and † at one year of age.

of congenital Chagas disease were diagnosed between 2013 and 2018, representing an incidence of 0.02% for the whole period over the total number of pregnancies (n: 31,457), and of 1.4% over the total Chagas-positive pregnant women (n: 358). Three cases were diagnosed with the modified Strout method and two with serological reactions. The treatment in neonates was carried out with benznidazole in the Department of Neonatology, and patients were followed-up until the treatment was completed. Treatment efficacy was verified by negative test reactions and normal cardiac tests.

Limitations include the fact that some patients did not return to the hospital for the second and third post-discharge follow-ups. Furthermore, neonates born on Saturdays and Sundays were not tested for Chagas with the modified Strout method.

In conclusion, this series of more than 30,000 pregnancies –most of them controlled for Chagas disease reactivity– allowed to calculate the incidence of congenital Chagas over a 6-year period in a public hospital of the Province of Buenos Aires. This sample showed a decrease in the percentage of women not tested for Chagas disease from 19.6% in 2013 to 14.5% in 2018. However, the incidence of Chagas-positive mothers will vary according to the epidemiology of the disease in each zone or province. In our case, the National Law No. 26,281 provided the tools for the diagnosis, treatment, prevention, and control of this disease.

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#### Conflicts of interest

None declared.

(See authors' conflicts of interest forms on the website/ Supplementary material).

**Regina E. Alvarez, Marcelo D. Benassi,  
Mónica Gili, Marisa López, Jorge Arbizu**

Dr. Salvador Mazza Chagas Disease Council of the  
Argentine Society of Cardiology  
and Hospital Mi Pueblo, Florencio Varela,  
Buenos Aires Argentina

Regina E. Alvarez: Cardenal Cagliero 204, Bernal, Buenos Aires,  
Argentina (B1876BXD) reginaestelaalvarez89@gmail.com

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