

Case Report

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**Pericardial effusion in newborns secondary to PICC:  
Case report and Literature review.**

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**Abstract**

**Keywords**

PICC,  
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cardiotoracic index.

PICC have been used since 1973 for the administration of solutions, medicines and parenteral nutrition in premature infants, favoring weight gain in all ages, with the disadvantage of not allowing the measurement of central pressures, the administration of blood products and taking samples. Polyurethane catheters, promote insertion due to their rigidity, present late complications that can be divided into infectious and mechanical, infectious are associated with prolonged stay and manipulation, the mechanics associated with relatively slow circulatory states of the venous system favoring the risk of occlusion. The cardiac tamponade associated with PICC insertion is a rare mechanical complication; the recognition and treatment of pericardial effusion reduces mortality and predicts considerably. We present a premature patient with successful pericardial effusion associated with migration from the tip of the PICC.

**Introduction:**

Peripheral insertion central catheters (PICC) in neonates are used since 1973, when Shawn introduced an intravenous silicone catheter into the central vein of a newborn infant, <sup>1,2</sup> popularizing its use in the 80s in the care units Neonatal intensive care <sup>2</sup>, PICC are used for the safe administration of hypertonic fluids, irritant medications and parenteral nutrition in preterm infants, especially those of low birth weight. <sup>3</sup> ensuring a weight gain in up to 75% of newborns in all age groups. <sup>4</sup> Because its placement is less expensive,

atraumatic, easy to install and without requiring general anesthesia, it can be used for a long time, decreasing the risk of catheter-associated infection, by not requiring a wound for insertion. <sup>2,3</sup> as disadvantages of presenting not allowing the measurement of central pressures, the administration of blood products and taking samples. <sup>2</sup>

The cardiac tamponade associated with PICC insertion is a rare mechanical complication.<sup>5</sup>, we present a premature patient with successful pericardial effusion associated with migration of the PICC tip.

### Clinical case:

Premature male newborn of 33 weeks of gestation, firstborn, born by caesarean section due to severe preeclampsia and perinatal asphyxia, enter intensive care due to respiratory difficulty, weight 1810, size 42, report of transthoracic echocardiogram of miniduct in the closure, without structural alterations and conserved myocardial function, poor evolution due to sepsis and pulmonary hemorrhage, which requires an advanced airway management, change of catheter by PICC of polyurethane 2 fr. (0.3 x 0.6 mm) of 30 cm,

radiographic control at the headset level, elbowed, 2 cm removed, with adequate return and permeability.

After 72 hours, he presented tachycardia, with cardiomegaly in right cavities, with ventilatory improvement and mechanical ventilation on the seventh day; continued with tachycardia and hypertension, re-evaluated by cardiology with a heart rate 170', increased differential blood pressure, chest radiography with cardiotoracic index .77, normal pulmonary flow. (Figure 1)

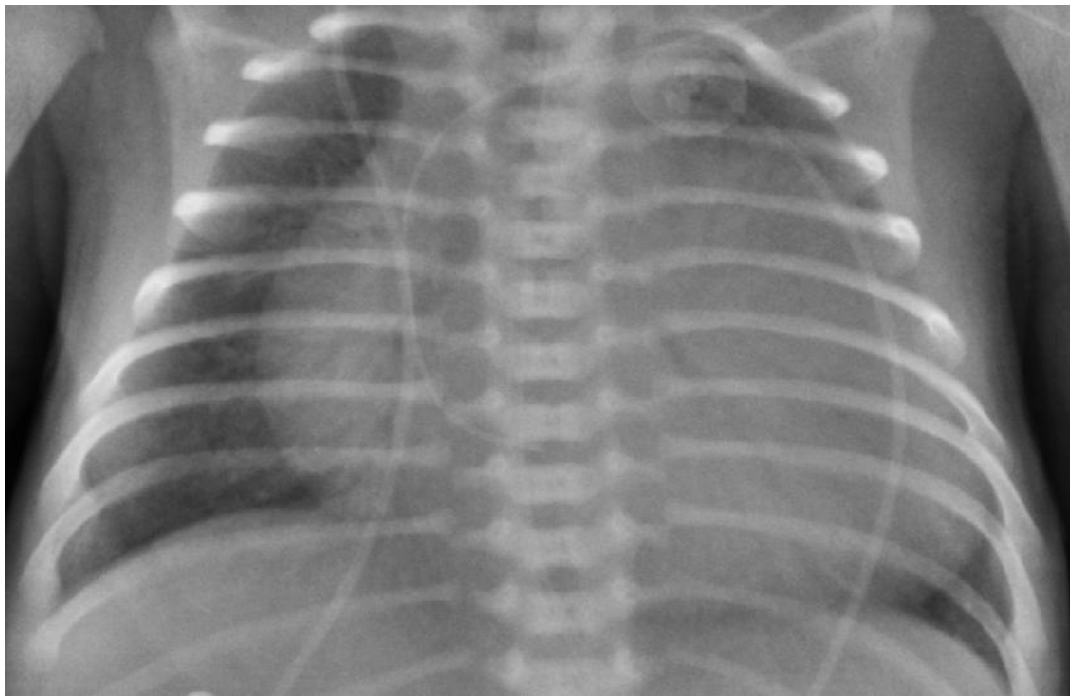


Figure 1. Anteroposterior chest X-ray, Cardiomegaly with catheter tip in the right atrium.

Echocardiogram: global pericardial effusion, distance between anterior laminae 10.6mm, posterior 13.7mm, apical 10mm, at the level of the short axis of the vessels 8mm, with inspiratory collapse of the right atrium, as well as the left ventricle, altered tricuspid

filling pattern, altered mitral filling pattern with increase of the "e" wave and decrease of the "a" wave, paradoxical septal movement (Figure 2), pericardiocentesis was performed obtaining 50ml (figure 3).

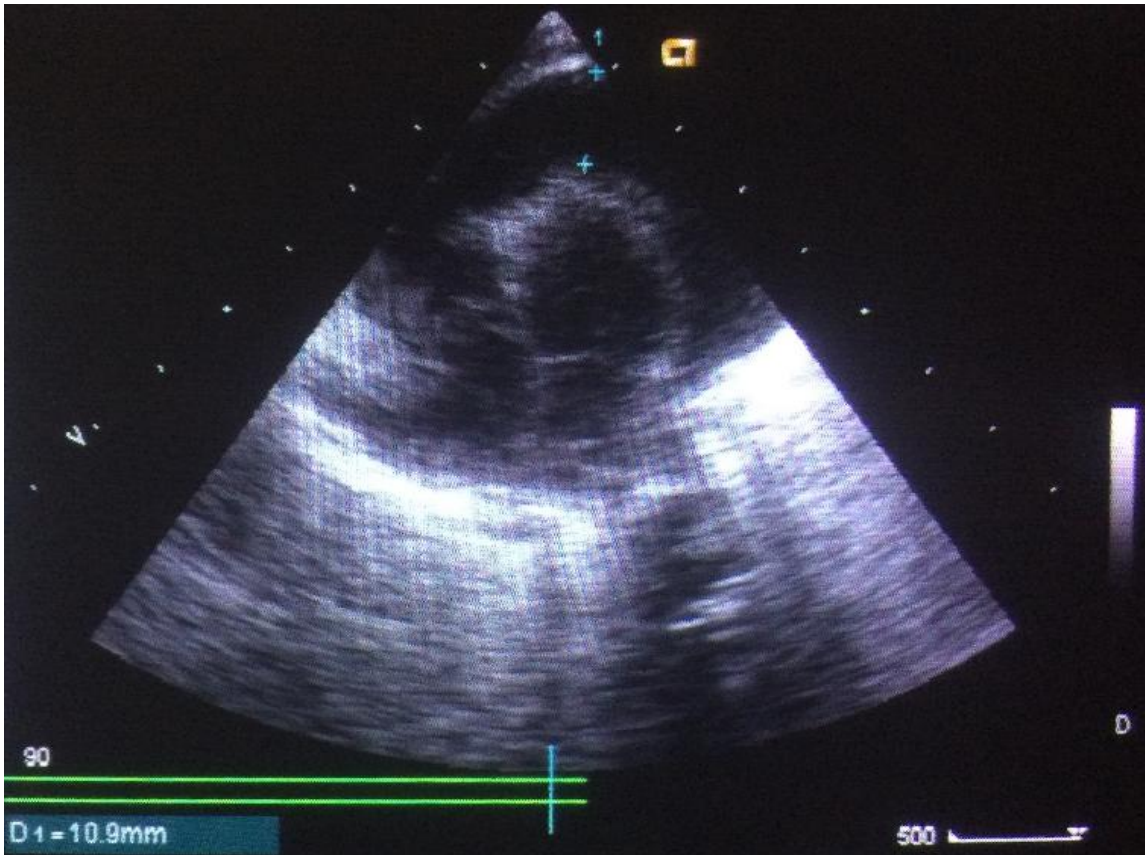


Figure 2: echocardiogram: Apical 4 chambers with total pericardial effusion.

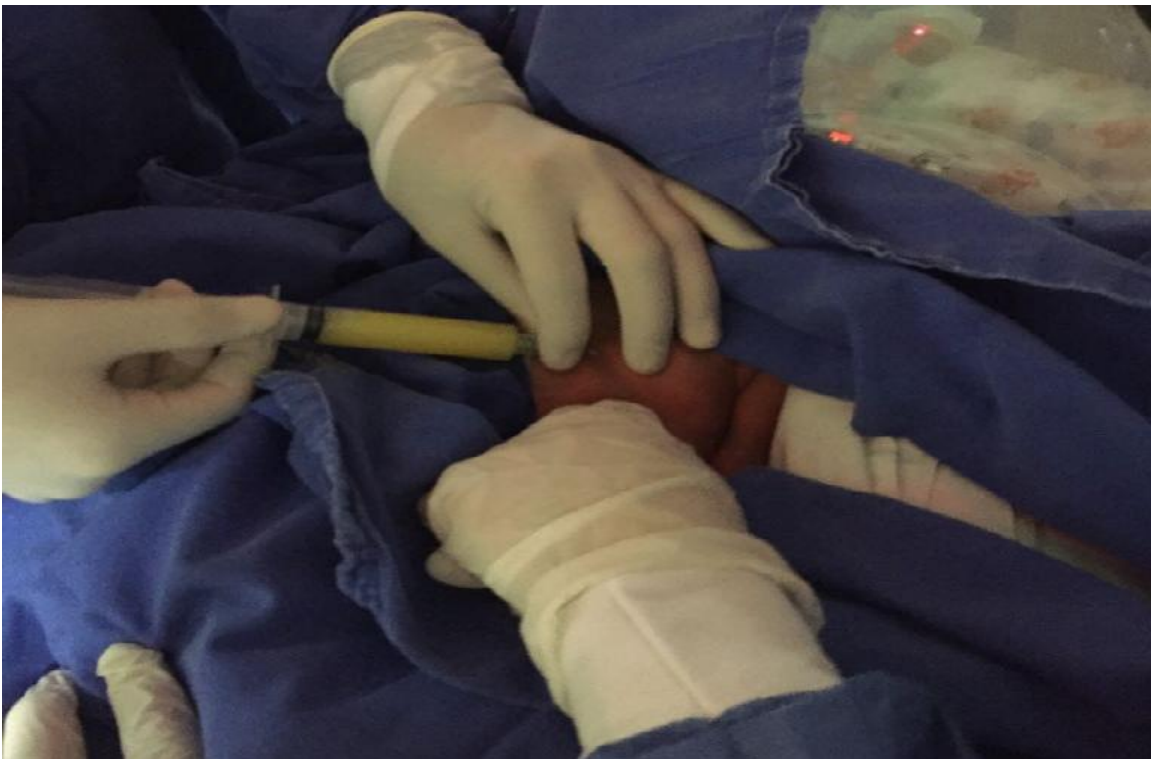


Figure 3: pericardiocentesis with cloudy yellow liquid

Yellow liquid, cloudy, erythrocytes 180, leukocytes 70, negative culture. Glucose 75.3 calcium 7.2, sodium, 141, potassium 4.03, magnesium 2.24, phosphorus 4.2, chlorine 14.3. Lactate dehydrogenase 41. Proteins 502, percutaneous catheter is removed due to its dysfunction.

Control echocardiogram, with adequate expansion of the right atrium and improvement of contraction

pattern with residual pericardial effusion, distance between sheets 2 mm, 4 hours later with obstructive shock, radiographic control with pneumopericardium (figure 4), draining 25 ml of air, with scarce residual, with remission and normal radiographic control. Adequate evolution, without subsequent infectious complications, is discharged after 24 days, without supplementary oxygen, echocardiogram without alterations.

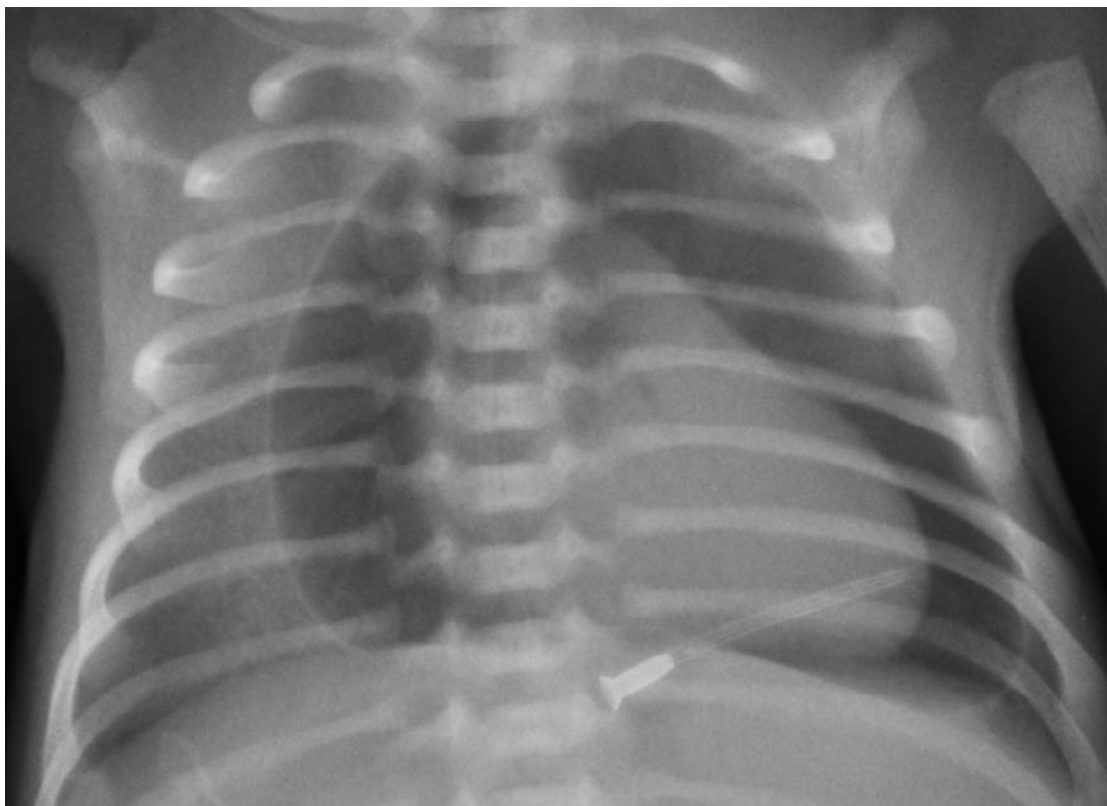


Figure 4. Anteroposterior thorax, with pneumopericardium.

## Discussion:

PICC is a reliable option for the administration of fluids and medications, in premature newborns, thanks to its insertion characteristics. It is recommended the use of non-nutritive suction with sucrose or human milk, application of pilocarpine and local lidocaine during insertion for pain reduction, since they do not modify the success rates or complications associated with the insertion.<sup>6</sup> Success percentages per attempt are estimated at 66% and per patient at 86%.<sup>5</sup> The most frequent insertion sites are: basilic vein 41%<sup>7</sup>-56%; cephalic vein 25%; metacarpal vein 3%;<sup>4</sup> Complications associated with insertion are presented in 16.4%<sup>8</sup>, bleeding in the first place with 24.6%, and arterial puncture in 8.8%.<sup>5</sup>

Polyurethane catheters, favor insertion due to their stiffness compared to silicone catheters, however, this quality increases the risk of local complications, as well as those associated with the migration of the tip of the catheter, which present up to in 4.6% in central position, increasing when displaced towards the midline (6.1%)<sup>9</sup>, the most common positions at the time of insertion are: subclavian 46.7%, vena cava superior 37.3%, vena cava inferior 7%, vein axillary in 6.8%, and the rest in other positions<sup>4</sup>, having to corroborate the position of the tip of the catheter in the junction of the superior cava with the right atrium, to prevent complications<sup>10</sup>. manipulation of catheters is associated with late complications<sup>7</sup>, occurring in (9.97%); 3.64 for every 1,000 days<sup>3</sup>.



These complications can be divided into infectious and mechanical<sup>1,3,4,7,11,12</sup>. Infectious complications usually occur around 19 days up to 9.1% of catheters<sup>12</sup> and its frequency is associated with prolonged stay and associated factors such as prematurity (68.8%) and low weight (87.5%). Mechanical complications occur earlier around the 6th day<sup>3</sup>, in 5-19%<sup>11</sup>, associated with relatively slow circulatory states of the venous system, favoring the risk of occlusion<sup>13</sup>.

They are divided into:

Obstruction of the venous route by elbowing along the path, in 34.3%<sup>4,12</sup>

Filtration of parenteral fluids at the junction of the catheter by displacement.

Accidental output 2.4%<sup>8</sup>

Thrombophlebitis

Displacement of the tip associated with<sup>1</sup>

-Pleural effusion 0.27%<sup>8,14</sup>

-Pericardial effusion 0.9%<sup>5</sup>

-Cardiac arrhythmias<sup>10</sup>

## Conclusion

Nevertheless, PICCs continue to be the best option for the long-term administration of fluids in neonatal intensive therapy, due to their great advantages; knowing the technique of insertion, corroborating the functionality and position of the tip by image decrease the risk of early complications, frequent monitoring being important, should limit the manipulation as well as take into account the incidence, and time of appearance of the different types of complications in order to prevent, identify and treat them in a timely manner. The recognition and treatment of pericardial effusion reduces mortality from 75 to 8%<sup>1</sup>.


## Competing interests

The authors declare that they do not have any type of conflict of interest, contribute to the exchange of knowledge

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