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Multiple factors can cause difficulties with PICC-port insertion and the right tip position is in rare cases difficult to access, as shown in our case-report.

Case presentation:

- 38-year old obese (BMI 33) female with metastatic ovarian cancer (peritoneal carcinomatosis, lung and pleural metastases) requiring intravenous chemotherapy, had her single lumen 5F PICC-port line placed via the left vena basilica
- During the procedure using ECG navigation, P-wave elevation was shown indicating the position of the end of the catheter in the cavo-atrial junction. PICC- PORT was placed without problems and treated according to the standard (picture nr. 1,2)
- Control chest X-ray, badly readable for obesity and large breasts, after first reading described the position of the catheter in the right atrium - the exact tip position was not exactly specified (picture nr.3)
- The position of the catheter was subsequently modified, catheter was pulled-out by 5 cm and properly fixed
- Second chest X-ray, after correction, showed the tip position of the catheter without any change
- Detailed analysis of the 1st X-ray image showed the exact position of the PICC tip deeply in the right atrium, creating a loop, with the position of the catheter tip at the entrance to the right atrium. Therefore, the presence of P-wave elevation on intra-cardiac ECG was present.
- Our hypothesis is, that at first (immediately after catheter insertion, when the guide wire was still placed inside the catheter) - the tip of the catheter was located in the right atrium (picture nr.4 – marked red). It formed a loop, so it was possible that the ECG showed P wave elevation indicating

the right tip position (we did not have the option of fluoroscopy to check the tip position in real time

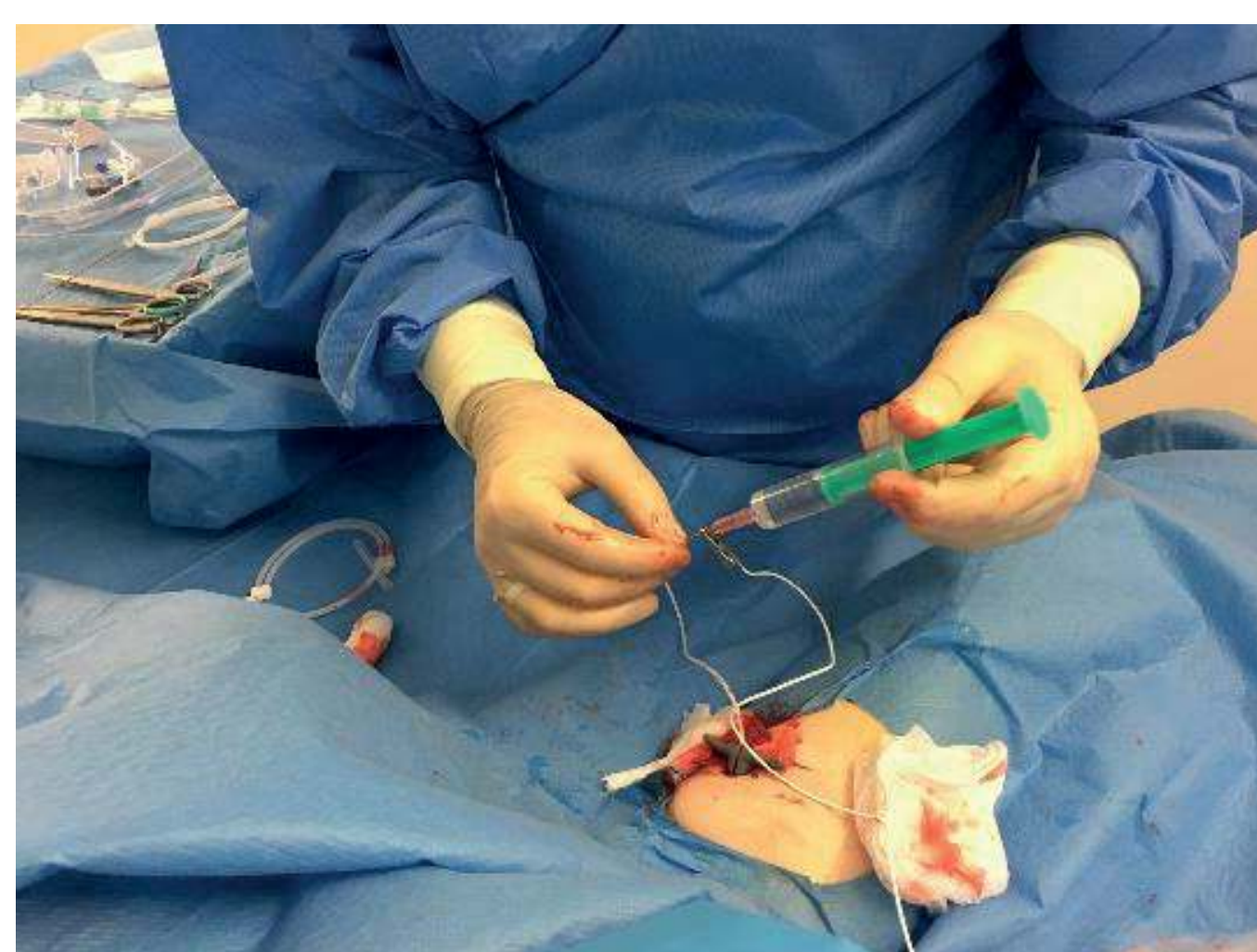
- Then, when we removed the guide wire, the loop resolved and the tip moved to the right ventricle (picture nr.4- marked blue)
- We performed echocardiography to locate the catheter tip /using second method (picture nr.5) : the end of the catheter was seen on the echocardiography in the right atrium touching the right tricuspid valve, influencing the movement of the valve. Because of this malposition, the line was extracted, without any complications.

Discussion: There are some hypotheses that body habitus (obesity or large breasts) can contribute to tip migration and increase the risk of malpositioning. The literature review also revealed, that although ECG navigation and plain chest X-ray are standard modalities for confirming tip location, in some cases, additional diagnostic methods to confirm or rule out catheter tip malposition should be used. The recommendation in case of intravascular central venous catheter malpositioning is to remove and relocate the catheter.

On this issue (this type of malposition mechanism), according to our knowledge, there are no data available in the literature.

Literature:

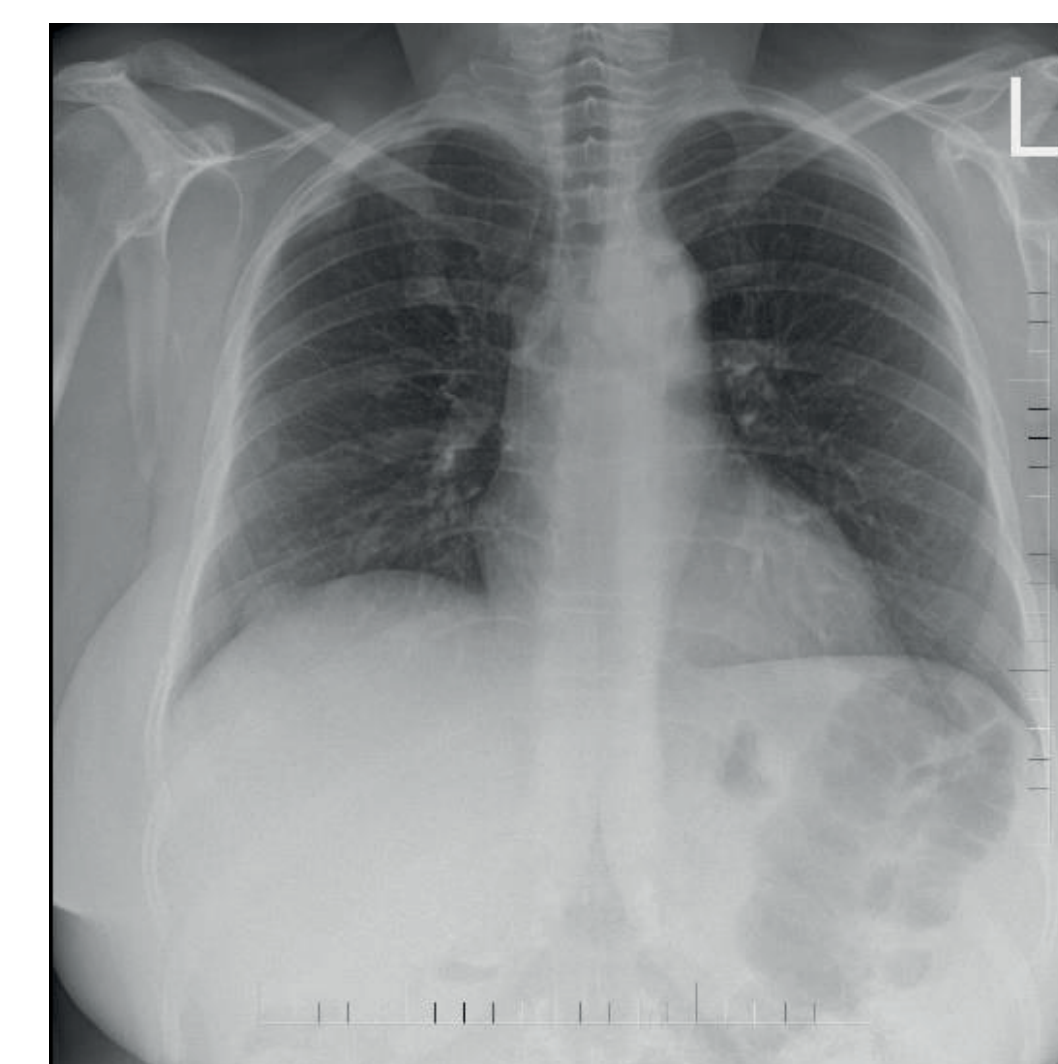
Nadine Nakazawa, Challenges in the Accurate Identification of the Ideal Catheter Tip Location. Journal of the Association for Vascular Access, Volume 15, Issue 4, 2010, Pages 196-201;
Carlos J. Roldan, Central Venous Catheter Intravascular Malpositioning: Causes, Prevention, Diagnosis, and Correction. Western Journal of Emergency Medicine. Volume 16, Issue 5, 2015



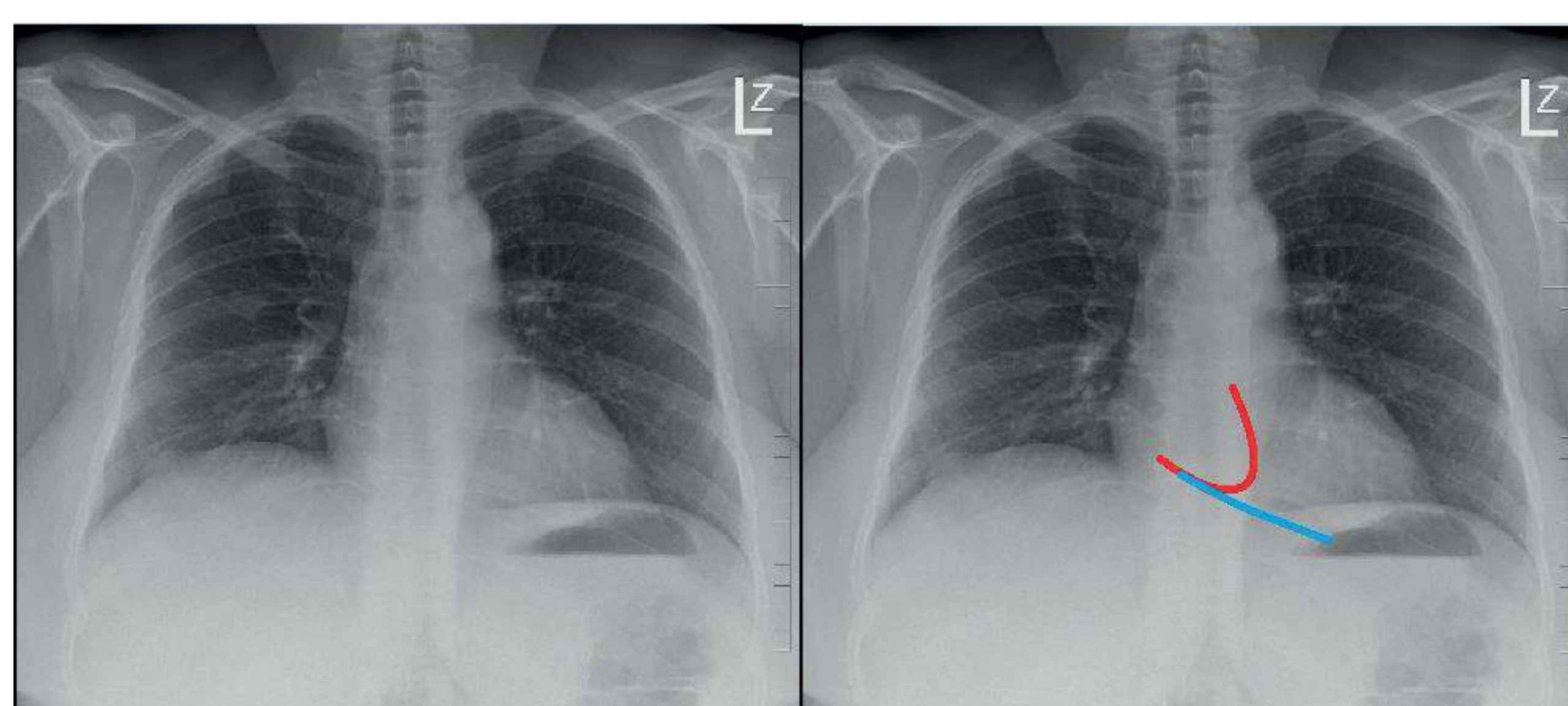
Picture Nr.1: ECG navigation during PICC insertion



Picture Nr.2: P wave elevation – indicates the right position of catheter end



Picture Nr.3: First chest X-ray - position of catheter end – inconclusive



Picture Nr.4: control X-ray (first position of catheter tip in the right atrium forming a loop- marked red; definitive position of catheter tip after the guide wire removal- marked blue)



Picture Nr.5: echocardiography – reveals the catheter end in the right atrium touching the mitral valve