East Kent Hospitals University NHS
NHS Foundation Trust

The use and benefit of ECG for confirming PICC tip position.

Gemma Oliver
Nurse Consultant IV Care

We care

East Kent Hospitals University NHS
NHS Foundation Trust

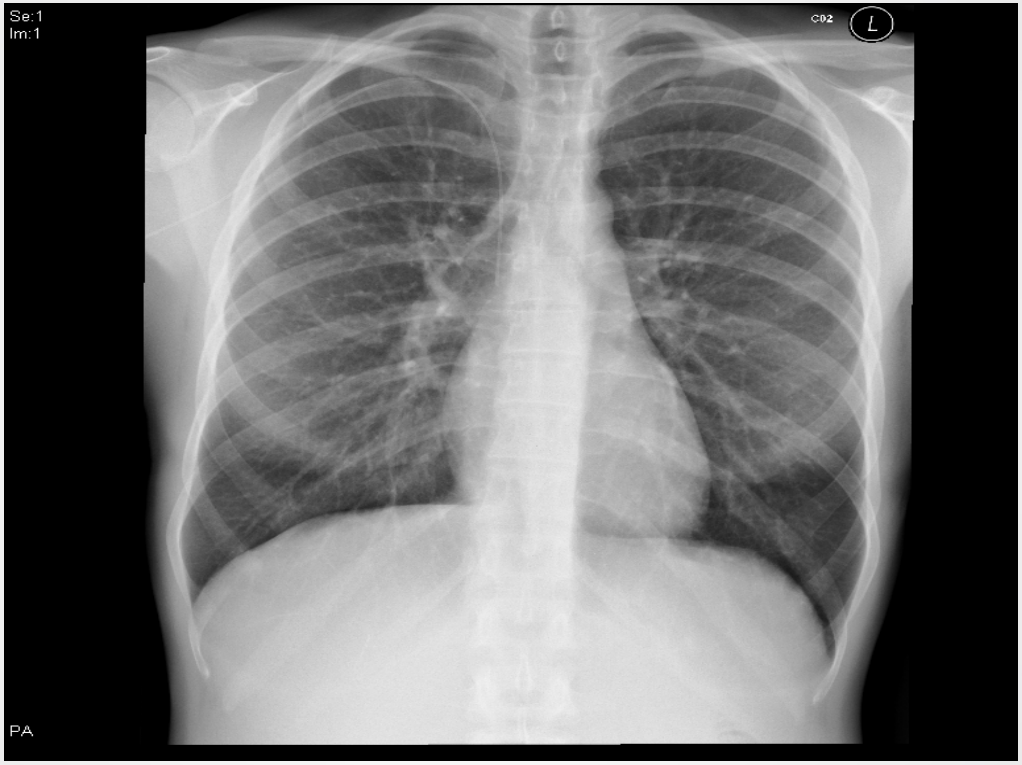
Importance of ideal PICC/CVAD tip position

- Long straight drop parallel to vein
- Lower third of SVC/ cava-atrial junction/ right atrium
- Too short- thrombosis, infection etc
- Too long- arrhythmias, atrial thrombosis etc

We care

East Kent Hospitals University NHS
NHS Foundation Trust

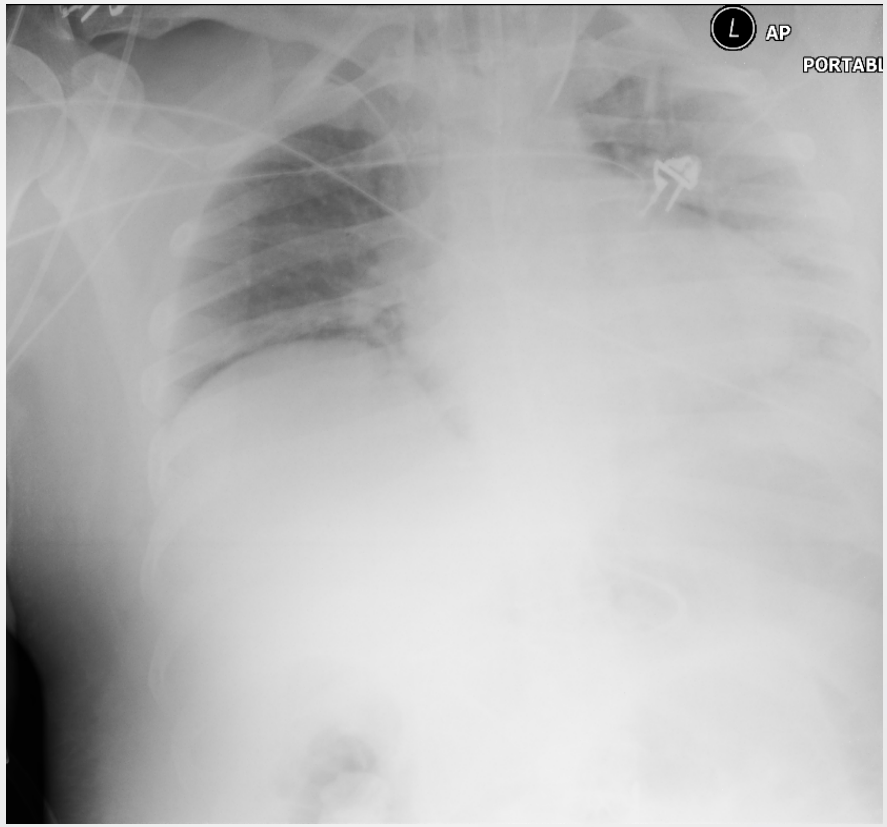
Chest x-rays



Landmarking?

We care

However the reality can look like this….



We care

East Kent Hospitals University NHS
NHS Foundation Trust

PICC tip location…

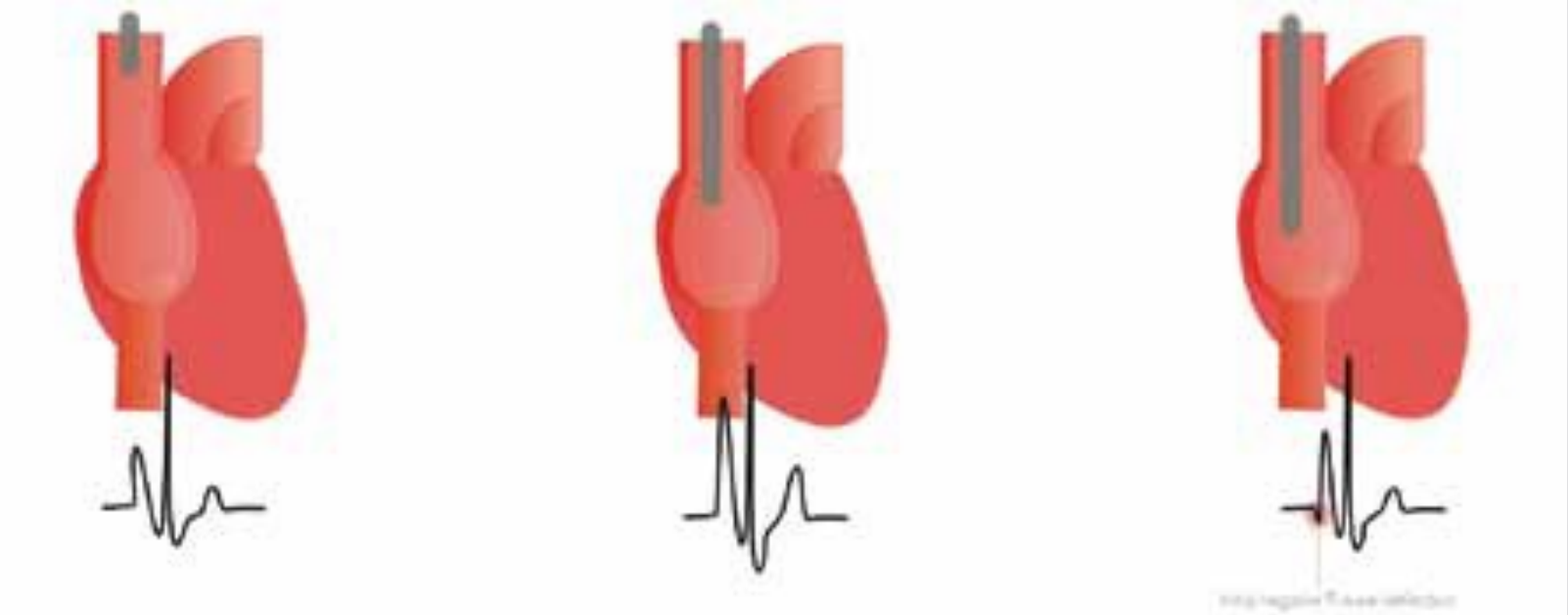
- Over a 4 month period (2011) a total of 597 PICCs were placed with follow-up chest radiographs
- *Placement deemed satisfactory 509 (85%)
- *Placement deemed unsatisfactory 88 (15%)

Reason Position Unsatisfactory	Number (total 88)
Too short	13
Too long	45
In jugular vein	17
Looped	13

We care

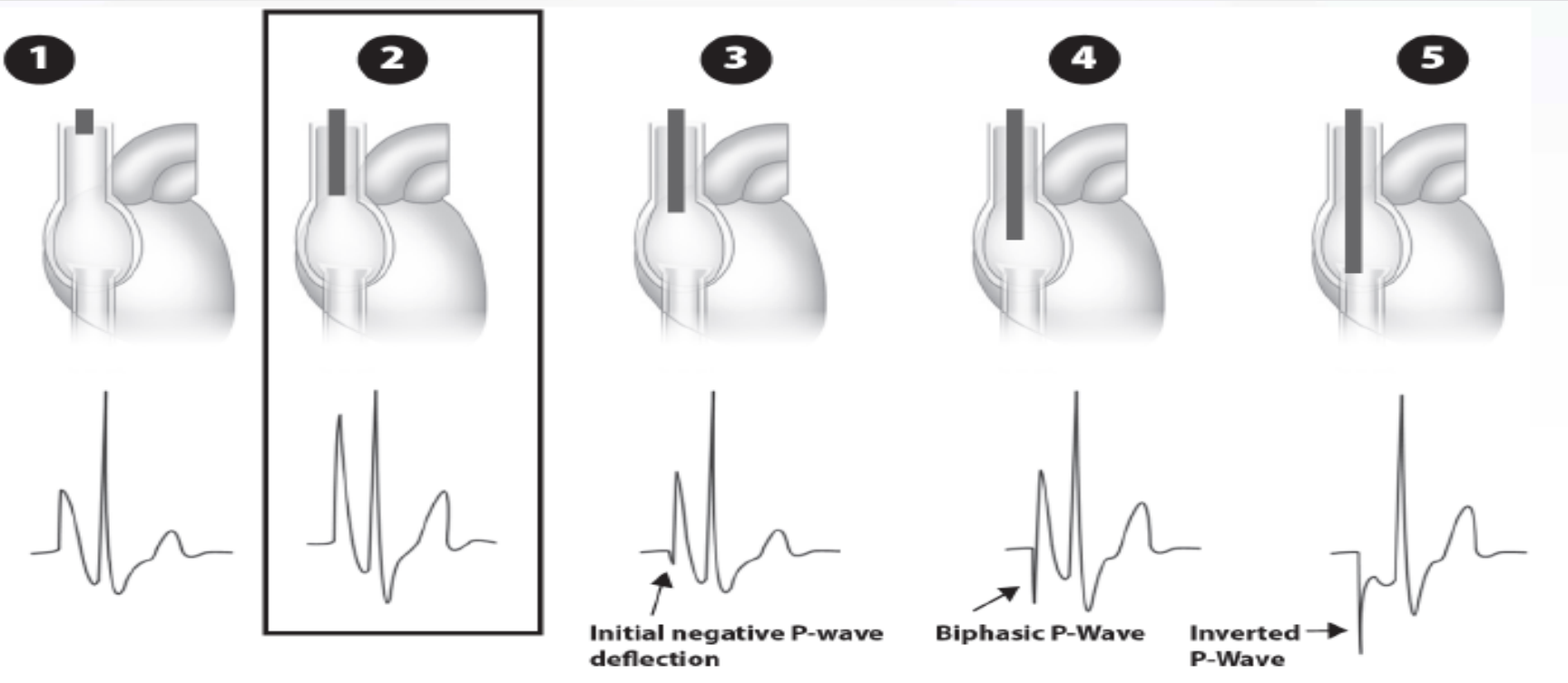
East Kent Hospitals University NHS
NHS Foundation Trust

ECG…… How it works



East Kent Hospitals University NHS
NHS Foundation Trust

Optimal ‘P’



We care

Difference in placement technique

- Added assessment questions- AF/ pacemaker
- Staying sterile connecting the lead/touchpad
- Think about PICC/CVAD length
- Time added to procedure?

East Kent Hospitals University NHS
NHS Foundation Trust

Getting a good trace

- Flush well
- Minimise movement of the line- put it down
- Let the ECG ‘Settle’
- Relax and take your time

We care

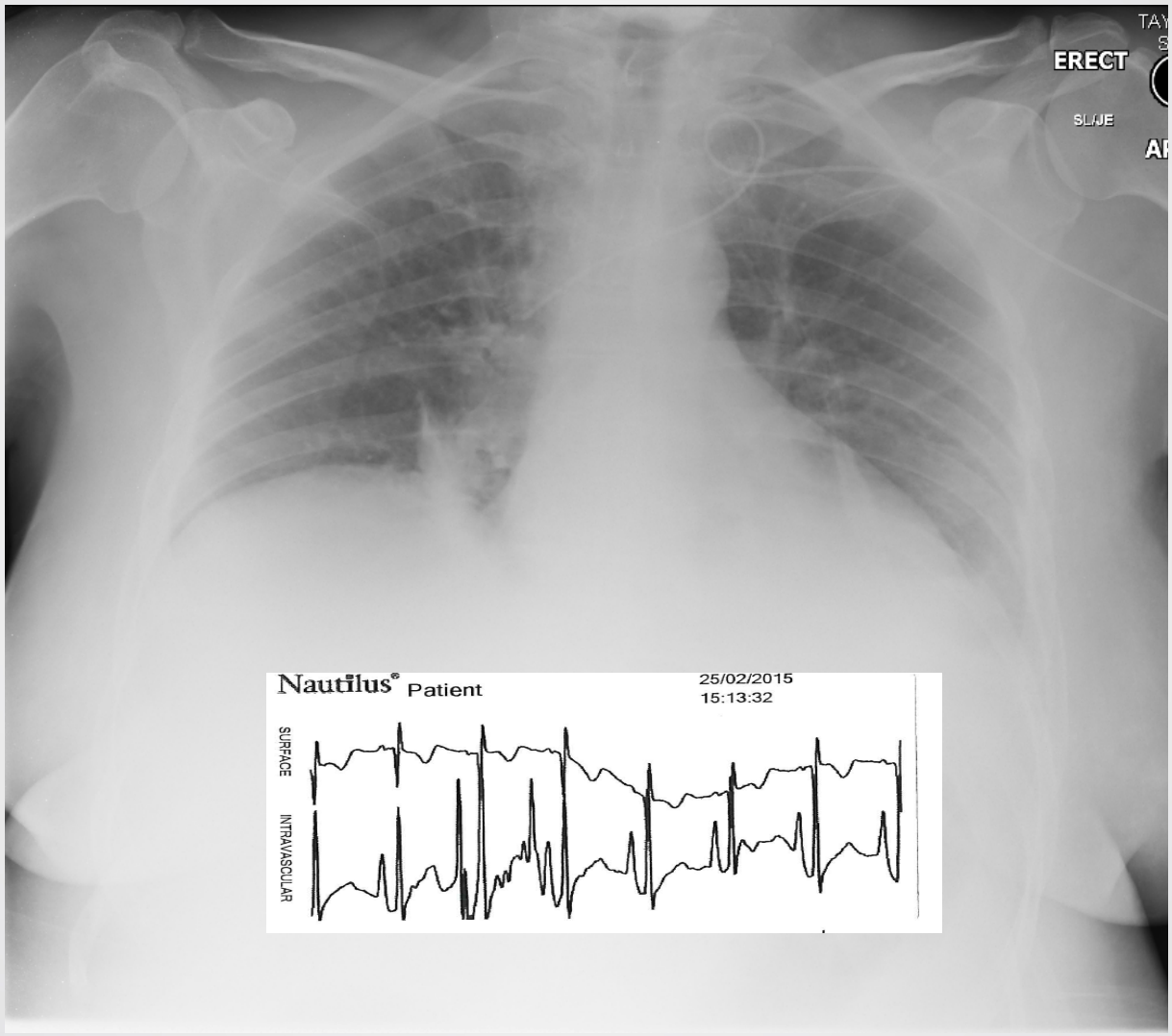
Misconceptions

- That the PICC/CVAD is changing the ECG/heart rate/rhythm
- That you are measuring ectopics!

Problems with ECG

- Patients without ‘P’ wave,
- Learning curve of procedure?
- Expensive????
- Accurate?

We care


ERECT
SLIJE
Nautilus® Patient
25/02/2015
15:13:32
SURFACE
INTRAVASCULAR

We care

Safety of procedures

X-ray

- Radiation
- Accuracy of interpretation
- Time delay to starting treatment

ECG

- No reported safety issues in literature
- Conversely the procedure may actually be safer using ECG

We care

East Kent Hospitals University NHS
NHS Foundation Trust

PICC's placed with post procedural chest x-ray

Ward patient referred to vascular access team for PICC- required for TPN, toxic drugs, urgent IV's, long term IV therapy etc

Reviewed on average in 1hr 25mins by VA Nurse
Appropriate PICC's inserted on average 1hr 36mins from referral

Average PICC insertion time 20mins

Post procedural chest x-ray ordered
Average ward waiting time 1hr 33 minutes
Quickest time- 9 minutes, Longest time 5.05 hrs

During this time IV treatment is withheld

15% of patients within trust required PICC repositioning and repeat chest x-ray

If first X-ray shows PICC in correct position, IV treatment commenced on average after **3:29 hrs** after PICC referral

PICC's placed with ECG confirmation

Ward patient referred to vascular access team for PICC- required for TPN, toxic drugs, urgent IV's, long term IV therapy etc

Reviewed on average in 1hr 25mins by Vascular Access Nurse
Appropriate PICC's inserted on average 1hr 36mins from referral

PICC placed with real time intra procedural awareness of PICC tip location
Average time 25mins

IV treatment commenced on average **2:01hrs** after PICC referral

We care

So how many patients can we actually use ECG on?

	2013	2014	2015
Total PICCs	**1562**	**1490**	**1677**
Total ECG	1394 (89%)	1340 (90%)	1573(94%)
Total X-rays	168 (11%)	150(10%)	104 (6%)
AF	110	107	71
PPM	27	18	10
Machine Malfunction	19	21	17
Fluroscopy	2		1
Unknown			3
Difficult thread	9	4	2
Un-coperative patient	1		

We care

East Kent Hospitals University NHS
NHS Foundation Trust

Cost of x-rays…..?

- Varies widely: Quoted range £35-£90
- In 2011, our team placed 1650 PICCs, all with a post insertion x-ray, costing organisation between £57 750 and £148 500
- Plus, 248 patients required PICC reposition and an additional x-ray, costing a minimum of £8 680 (max. £22 320)

TOTAL = min. £66 430 max. £170 820

We care

2015

East Kent Hospitals University NHS
NHS Foundation Trust

- In 2015, 1677 PICCs were placed, 1573 of which were placed under ECG control. The additional cost of the disposables used for each procedure was £14, therefore costing £22 022

- However, not all PICCs were able to be placed under ECG confirmation alone: 104 patients required an X-ray, of which 15 then also required a repeat X-ray. Therefore, X-ray costs in 2015 were £4165 (104+15=119 x £35).

So in 2015, the total cost for PICC tip position confirmation using predominantly ECG in 2015 was £26 187.

is worth noting that there was an additional outlay for the ECG systems in 2012 of £22 600;

We care

East Kent Hospitals University NHS
NHS Foundation Trust

In Conclusion

	2011	2015
Method Used	X-Ray	ECG (Predominantly)
Cost of PICC confirmation	min. £66 430 max. £170 820	£26 187.
Time from Referral to PICC use	3hrs 29mins	2hrs 1min

We care

East Kent Hospitals University NHS
NHS Foundation Trust

Any Questions?
Thank You

We care