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# Capillary blood sampling for anti-Xa monitoring in paediatric patients- A practice changing quality improvement project at Birmingham Children's Hospital

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## INTRODUCTION

- Low molecular weight heparins (LMWHs) are the most frequently used anticoagulant of choice in the paediatric setting, yet their wide variation in dosing and response warrants frequent anti-Xa level testing for monitoring.
- Obtaining such Anti-Xa levels in young children poses a number of challenges, including difficulties with venous access and obtaining a free-flowing sample, as well as avoiding heparin contamination when samples are obtained from central lines.
- Capillary blood sampling is often used in children as an alternative to venepuncture, however, activation of the sample that occurs as a result of this process interferes with a number of coagulation assays, including the APTT, with the result that coagulation tests are generally only done on venous samples.
- Anti -Xa assays monitor the effect of heparin and should therefore not be affected by sample activation.

## AIM

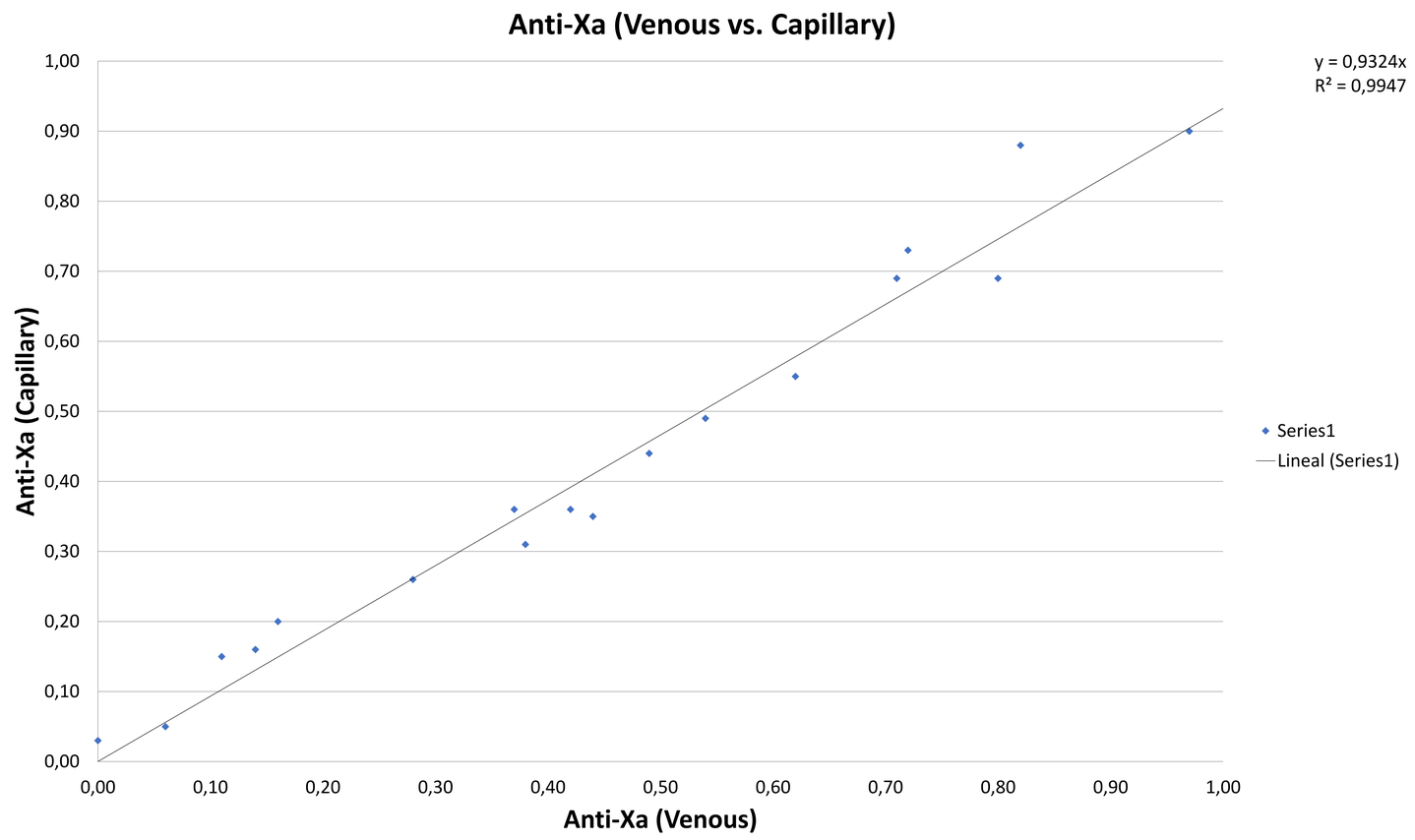
- Following on from previous work at Sheffield Children's Hospital, we conducted a study at Birmingham Children's Hospital to ascertain whether capillary chromogenic anti-Xa levels correlate with venous samples and can therefore be used as an alternative, less-invasive approach for monitoring LMWH.

## METHOD

- All patients receiving therapeutic LMWH with a target anti-Xa level of 0.5-1.0 IU/ml during the study period were eligible for inclusion in the study.
- A pre-study target sample size of 20 was calculated to ensure our results were representative.
- 20 paired venous and capillary samples were collected on 10 different patients over an 8-month period from October 2018-June 2019.
- Capillary samples were collected from the side of heel in infants or the ball of the thumb in older children. Chromogenic anti-Xa levels were performed on a Sysmex CS2000*i* analyser.

## RESULTS

- Data was inputted onto an excel spreadsheet and each value was plotted onto a calibration curve.




- Our results demonstrated that venous and capillary anti-Xa levels were comparable
- Anti-Xa levels monitor the affect of heparin and are therefore not affected by sample activation
- Our results are in agreement with Sheffield's work, and confirmed our hypothesis that capillary anti-Xa levels are a suitable alternative for children receiving LMWH therapy in whom venous access is challenging

## CONCLUSIONS

- Capillary anti Xa sampling offers a quick and less-invasive alternative for anti-Xa blood monitoring in children
- This is particularly relevant to the paediatric population in whom venous access poses a number of additional challenges, and wide variation in dosing and response can mean that many children require several samples to be taken before stable levels are reached
- As a result of our study, we have implemented a new policy at Birmingham Children's Hospital which enables children to have their anti-Xa levels monitored using capillary samples.
- This has led to significant improvements in obtaining anti-Xa levels at the correct time, and ultimately improved compliance with anti-Xa monitoring and maintaining therapeutic anti-Xa levels

## REFERENCES

Payne JH. Capillary blood samples for anti-Xa monitoring of heparin in paediatric patients. Thromb Haemost. 2017 Jan 5;117(1):198-200

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