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Piet Mondrian, Molen: The Winkel Mill in Sunlight, 1908
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SAPIENZA UNIVERSITÀ DI ROMA

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ARTERIOVENOUS FISTULA FLOW SURVEILLANCE: COMPARISON BETWEEN A NEW HEMODILUITION TECHNIQUE AND COLOR DOPPLER ULTRASOUND

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Introduction

K-DOQI guidelines recommend a regular surveillance and monitoring of arteriovenous fistula (AVF) flow (Qa) after creation. The most recommended technique is ultrasound diluition (Transonic), which is nevertheless expensive and unavailable in Italy. Color Doppler Ultrasound (CDU) is another technique recommended for AVF blood Qa measurement, with the limitation of requiring a skilled, experienced operator. In 2008 Tiranathanagui et al. described a significative correlation between Transonic and a new hemoglobin diluition technique (HDT) for Qa evaluation.
In our study we have analyzed the correlation between HDT and CDU for access flow evaluation.

Patients and Methods

We observed 14 patients in hemodialysis (HD) with distal radiocephalic AVF (median age 74.5, 12 M: 2 F, median BMI 25.4 , 79% hypertension, 14 % diabetes and 14 % cardiovascular disease). Each patient was evaluated with CDU and HDT performed by the same operator.
To determine the Qa by the HDT, the lines of HD circuit at priming has been reversed 12 seconds after starting blood pump (300 ml/min) two samples for Hb were collected.

Results

The measurement of the flow by HDT presented a significative correlation with CDU ($r^2 = 0.807$; $p<0.001$)(fig.1). The median (±SD) flow were measured by CDU and HDT 964 ± 335 and 875 ± 503 ml/min, respectively. Bland-Altman plot comparing HDT and CDU, showed that for AVF flow <1000 ml/min, HDT tends to underestimate Qa of 300 ml/min (fig. 2).

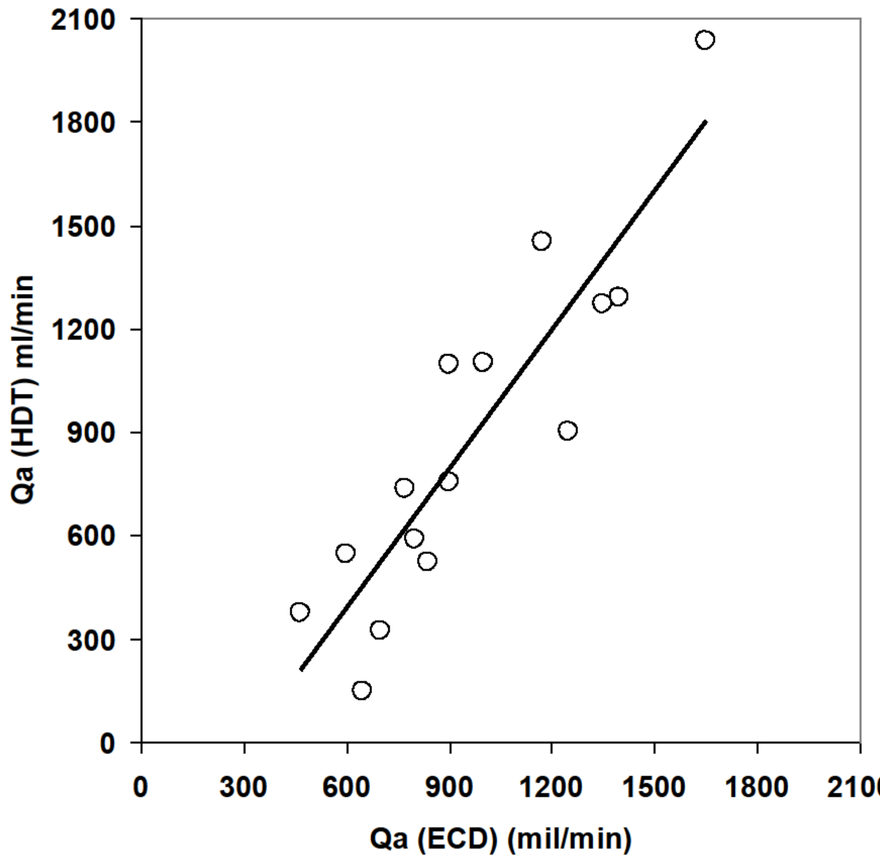

Fig. 1

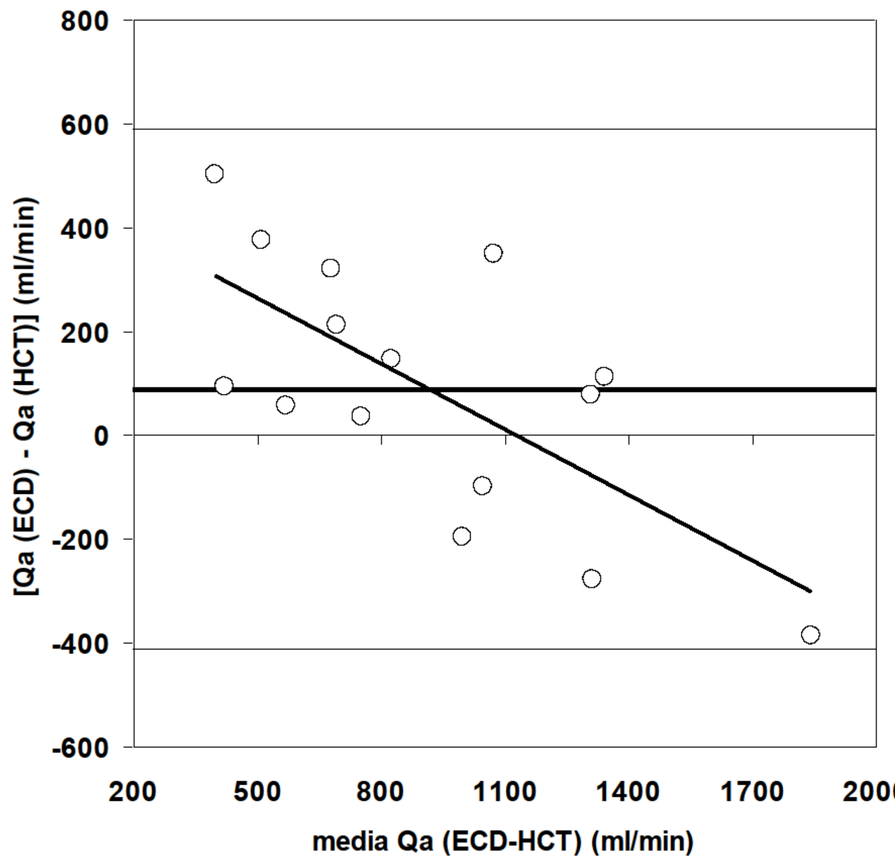

Fig. 2

Conclusion

The gold standard for arteriovenous access surveillance are considered Transonic and CDU. In our study we have observed that HDT correlate significantly with CDU. HDT has several advantages, being easy to perform and not expensive. Whenever its tendency to underestimate Qa for blood flow <1000 ml/min would be confirmed, the aim of preventing thrombosis through surveillance, would still be preserved. HDT seems to be a reliable alternative for AVF Qa surveillance. Further studies would help in better defining these preliminary results.

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