AIUM/QIBA
Ultrasound Volume Blood Flow Biomarker

MINUTES 2016-03-07

Attendance:

S. Chen, V. Devaraju. D. Dubberstein, B. Fowlkes, T. Hall, O. Kripfgans, R. Leichner, M. Lockhart, R. Managuli, K. Minton, S. Pinter, M. Robbin, J. Rubin, R. Tadross, T. Tuthill

Previous minutes were approved by Rubin and Chen.

I. Profile and Protocol discussion

1. *Discussion of Profile template.*
   Quantitative statements are those of bias and variance, in addition there are actionable items listed. UAB has a publication in variation and bias for PW flow estimation (Hoydt *et al* 2009, Figure 2) using the traditional method. Flow was ranging from 100 to 1000 mL/min.

Figure 2. Representative duplex sonograms and user measurements given a true volumetric flow rate of 500 mL/min. As indicated on the images, the corresponding measured flow rates were 486.2 mL/min (**A**), 530.6 mL/min (**B**), and 491.2 mL/min (**C**).

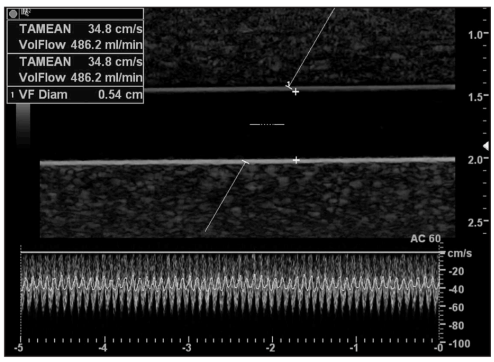
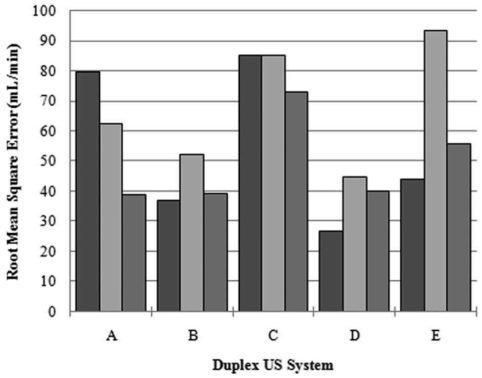


Figure 4. Summary of the RMSE for each user and corresponding duplex ultrasound system tested.



In addition arteriovenous fistula related paper (Robbin Radiology 2002).

2. *What precision is required for volume flow (i.e. clinical performance target)?*
   For renal transplants, flow/no flow is checked (color/power/PW), pink/blue tissue is checked, however, no quantitative measurement is taken.
   Presently there is no quantitative estimation; therefore there is no percent acceptable error available.
   References are available related to reproducibility and repeatability and specifically related to QIBA process (Sullivan et al. *2015)*.

3. *What actions are taken given a certain volume flow reading (i.e. what is the clinical relevance, the action level)?*
   If there is no actionable level, then we need to possibly borrow a level from another application or list a series of levels for different applications.

4. *What is flow cuff used for in operation suite? What dynamic range is there?*
   Transplant surgeons might not have an action level based on flow cuff measurements. Additional literature investigation and consultation with surgeons will be required to answer this.

5. *QIBA Round 6 Funding*
   April 15th deadline for first draft proposals (to qiba@rsna.org), possible proposal can be on phantom creation and circulation test sites. Possibly targeting a total of 3 sites. Logistics: Need to determine what scanner could be part of such a proposal.

III. Other items

- Verifying membership of the two subcommittees. Chen added to both subcommittees.

IV. Action items

- Update on the transplant # for UAB
- Create outline of proposal and discuss it in NYC
- Need hotspot for NYC meeting, example: http://www.att.com/att/gophone-mobile-hotspot/en/index.html
- Structure meeting in NYC
- What is flow cuff used for in operation suite? What dynamic range is there?
- Consult with Tim Hall about action levels and applications.

V. References

Kenneth Hoyt, PhD, Felix A. Hester, RDMS, RVT, Randall L. Bell, RDMS, Mark E. Lockhart, MD, MPH and Michelle L. Robbin, MD. Accuracy of Volumetric Flow Rate Measurements. An In Vitro Study Using Modern Ultrasound Scanners. JUM 2009 (28)11, 1511-8.

Robbin ML, Chamberlain NE, Lockhart ME, et al. Hemodialysis arteriovenous fistula maturity: US evaluation. Radiology 2002; 225:59–64

Sullivan DC, Obuchowski NA, Kessler LG, Raunig DL, Gatsonis C, Huang EP, Kondratovich M, McShane LM, Reeves AP, Barboriak DP, Guimaraes AR, Wahl RL, and Group R-QMW, Metrology Standards for Quantitative Imaging Biomarkers. Radiology, 277(3):813-25, 2015.