Author's response to reviews

Title: Cardiac tamponade: contrast reflux as an indicator of cardiac chamber equalization

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Dear editor,

First of all, we would like to express our great appreciation for the reviewer’s interesting and relevant comments. We fully agree with the reviewer that a better understanding of the characteristics of injected contrast may be of great importance for the improvement of diagnostic accuracy, especially as first line diagnostic modality.

An important difference between valvular dysfunction and cardiac tamponade is that valvular dysfunction is an internal problem and cardiac tamponade an external problem. This leads to the understanding that tricuspid regurgitation leads to an increased backward flow of contrast reflux at a specific moment in the cardiac cycle, being the systole. Cardiac tamponade however, causes cardiac chamber equalization leading to a constant external pressure followed by the reflux of contrast. Due to its constant pressurizing character, cardiac tamponade will presumably lead to a more constant backward flow of contrast reflux.
However, we do share the reviewer’s expectation that there should be a peak moment of reversal and that this moment should be atrial contraction at the end of diastole. But given the constant pressure caused by cardiac tamponade, we expect this peak to be minor.

In order to give clear answers to these expectations, ideally, a medically ECG-triggered CTCA scan as used in the article of Dusaj et al. [1] should be made. Using this method, a specific moment of the cardiac cycle could be imaged. Presumably the backward flow, measured as the column length of contrast into the IVC [1], will remain more or less constant with indeed a minor peak during atrial contraction at the end of diastole. However, usage of this method in traumatic cardiac tamponade will hardly be possible as no ECG-triggered CTCA scan can be made, due to the acute character of cardiac tamponade.

To conclude, we would like to comment that we expect a more constant backward flow of contrast during cardiac tamponade than during tricuspid regurgitation with presumably minor peaks during atrial contraction at the end of diastole. In order to discriminate between e.g. severe traumatic tricuspid regurgitation and cardiac tamponade, purely based on details of the contrast reflux, CTCA scans at a specific timing in the cardiac cycle could be of great help.

We sincerely hope to have given a clear response to the concerns.

Sincerely,

Foeke Nauta

References