

Tips on collecting video cases for BSE accreditation

SADIE BENNETT, CHAIR OF THE BSE ACCREDITATION COMMITTEE



Sadie Bennett

As BSE members, accredited or working towards accreditation, we all know the stresses and strains the accreditation process brings. We have all been in that situation of starting early, staying late, going in on the weekend, waiting for that one unfortunate patient with an LV thrombus or endocarditis to be admitted and running to scan them first. We also all remember that sinking feeling of completing a potential video case only for your mentor to say “you missed this” or “the colour scale is wrong throughout the case” or “you can’t use that”.

To try and prevent some of these stresses, over the next few editions of ECHO we aim to provide some tips on things to be mindful of when preparing video cases along with providing examples of adequate and inadequate work (please bear in mind that moving images sometimes do not display well as a 2D still image and examples should be used as a guide only).

Each edition will focus on a particular area of the marking criteria which can be found in the accreditation pack. Whilst the examples given are mainly from transthoracic echocardiography, the underlying principles will also benefit candidates, and mentors, for all BSE accreditation specialties. Over this and subsequent editions we will aim to cover the following areas:

- Optimisation and complete studies
- 2D measurements
- Colour and spectral Doppler
- Pathology assessment and report

Optimisation

Two dimensional imaging and optimisation is KEY in echocardiography. Good imaging and optimisation takes practice. It is vital to start practising this early on to ensure that this skill is second nature. Trust us, by doing this, when that perfect patient comes along, it will be a lot less stressful!

In order to pass this part of the marking criteria, we review to see whether there are:

“Infrequent, non-repetitive optimisation errors which do not detract from the case conclusion”

This means that if one or two images out of the whole study are sub-optimal for whatever reason, this part of the marking criteria will still be met. If, however, the vast majority of images are of poor quality with limited optimisation this part of the marking criteria will not have been achieved and the case overall will be unsuccessful.

We would encourage candidates to present their cases to their mentor and / or colleagues so they become comfortable talking through the case and familiar with explaining what they could have done to improve image quality in those few images where optimisation is sub-optimal.

Examples of adequate and inadequate images

In Figure 1a it is clear the 2D imaging is sub-optimal with the cardiac structures that are normally seen in this view poorly visualised. As you will appreciate the 2D gain is too high. Figure 1b is an example of the type of quality for which we should be striving. It shows a 'best practice', good quality parasternal long axis view accompanied by the appropriate 2D gain, sector width and depth optimisation. Figure 2a is an example demonstrating 2D sector width that is not appropriate for the apical four chamber view. Figure 2b is a better example of how the sector would be set for the apical four chamber view.

The adjustment of the focus point should also be considered and be set to the structure of interest for each image. BSE assessors acknowledge that newer machines may not have a focus control and this would therefore be absent from the image. This would not result in any negative marking for the candidate. To clarify understanding and underlying knowledge, the candidate may be asked to identify the ideal focus point position.

Complete studies

As part of the assessment of a video case it is expected that:

"Images are complete enough to allow full assessment of the selected pathology, including Doppler study and measurements"

Whilst we would advocate that a complete study is undertaken for all video cases we acknowledge that not all patients will have the "perfect study" and hence, isolated images may not be available. Where this is the case, it should be clearly stated in the report and the candidate should be able to talk through why it was not available and what they would be looking for in the view in question. That said, candidates still need to demonstrate all relevant views for the pathology being assessed. For example, it would not be acceptable to present an aortic stenosis case without a stand alone Doppler trace (from one other view) and comment that this view was not available.

We hope this helps you on your path to achieving suitable video cases, and in your day to day echo practice.

Yours sincerely,

BSE Accreditation Committee.

Top tip:

Keep things simple and avoid multiple measurements by:

- Choosing a patient in sinus rhythm
- Using isolated pathologies
- Avoiding patients with excessive breathing patterns

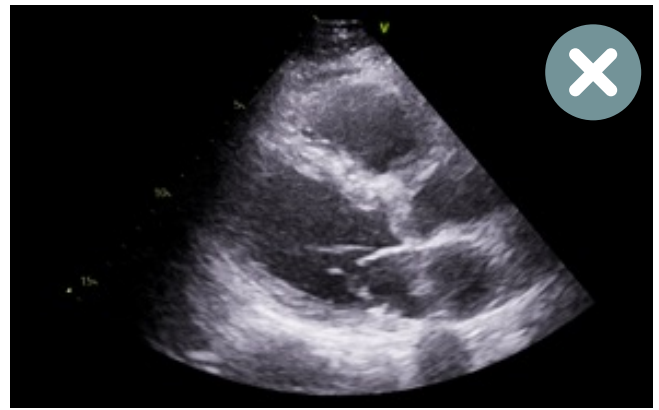


Fig 1a.

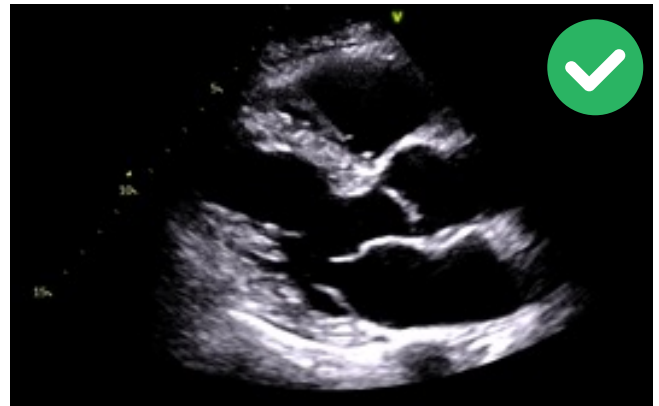


Fig 1b.

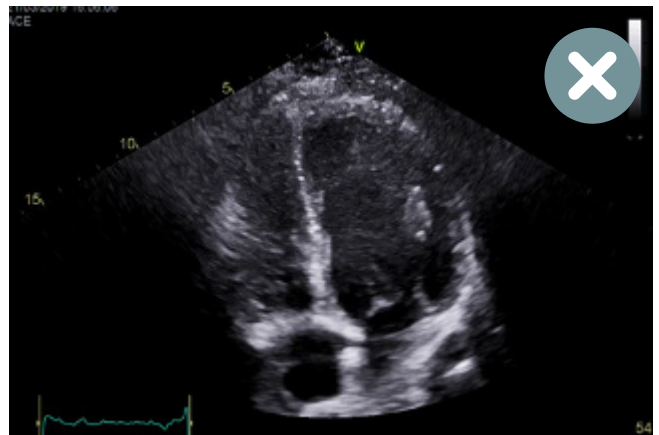


Fig 2a.



Fig 2b.

Tips on collecting video cases for BSE accreditation: 2D Measurements

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The September edition of ECHO (issue number 119) saw the first in a number of articles dedicated to providing candidates and mentors with some tips on collecting video cases for BSE accreditation. Hopefully these tips and examples help to alleviate some of the stress associated with undertaking and preparing video cases for the practical assessment.

In this piece I will discuss the marking criteria for 2D measurements and provide examples of adequate and inadequate work. Again, whilst the examples given are mainly from transthoracic echocardiography, the underlying principles will also benefit candidates and mentors for any BSE accreditation specialties.

2D measurements

2D measurements are an important part of echocardiography and the ability to perform these accurately is crucial to ensure accurate reports are provided for patients. It is important to have a good understanding of when, within the cardiac cycle, measurements for the different structures should be undertaken. Furthermore, the knowledge of appropriate locations and landmarks on which to base measurements is also vital. The 2020 publication from the BSE "A practical guideline for performing a comprehensive transthoracic echocardiogram in adults"¹ is a great starting point for learning and I would encourage all candidates to read this article as soon as possible as it will undoubtedly assist in helping to undertake accurate measurements, not only for video cases, but also during our daily clinical practice.

When assessing 2D measurements in a video case, we look to ensure that the included measurements are:

"Accurate throughout, with minor errors that do not change the categorisation of the chosen pathology".

This means that if there are minor errors in measurements which do not alter the reporting of the chosen pathology, this element of the marking criteria will still be met. However, if measurements are significantly inaccurate and lead to reporting errors, this part of the marking criteria will not have been achieved and the video case overall will be unsuccessful.

The inclusion of m-mode measurements (for the assessment of left ventricular size, for instance) has been removed from the marking criteria. However, candidates can still choose to include these if they wish. If candidates wish to include m-mode measurements, these must be accurate and will be assessed as per the marking criteria for 2D measurements.

It is acknowledged that new echocardiography systems have automated measurement functions and that some centres

are using these on a routine basis to improve departmental workflows or for quality assurance purposes. For the purpose of candidate's video cases, these measurements are permitted as ultimately it is the practicing echocardiographer's responsibility to ensure these are accurate prior to these being accepted and incorporated into the study and report.

Examples of adequate and inadequate 2D measurements

Figure 1a is an example of left ventricular (LV) dimension measurements being taken on the frame before the mitral valve closes (other surrogates for end ventricular diastole can be used, as stated in the 2020 publication from the BSE "A practical guideline for performing a comprehensive transthoracic echocardiogram in adults").

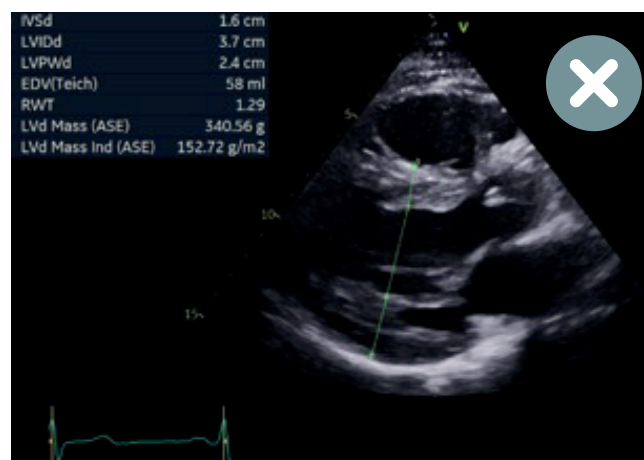


Fig 1a.

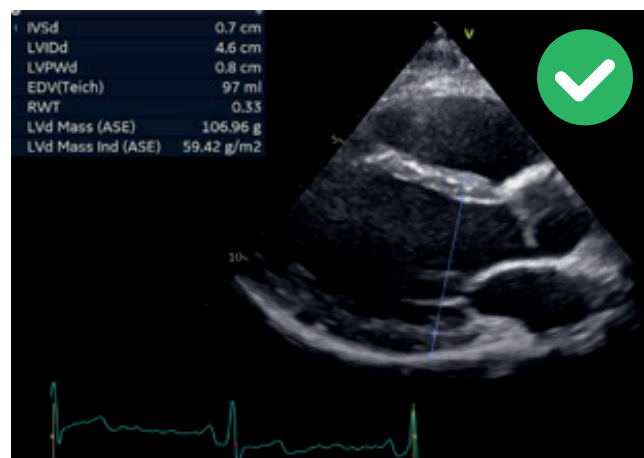


Fig 1b.

However, incorrect landmarks have been used resulting in the intra-ventricular septum and infero-lateral LV wall thicknesses being overestimated. In particular, the infero-lateral LV wall dimension is recorded as 2.4cm as it includes part of the mitral valve chord. These errors subsequently result in the report of a male patient being incorrectly labelled as “normal LV cavity size with severe concentric hypertrophy”. As you can see this is inaccurate and would result in the marking criteria not being met. Figure 1b is an example of where the LV dimensions would meet the marking criteria as they have been undertaken at the correct part of the cardiac cycle, at the correct location (level of the mitral valve leaflet tips) using the correct anatomic landmarks.

Figure 2a is an example demonstrating an inaccurate left ventricular outflow tract (LVOT) dimension as it has been undertaken during ventricular diastole approximately 1cm below the aortic valve cusps. In accordance with the BSE guideline “A practical guideline for performing a comprehensive transthoracic echocardiogram in adults”, the LVOT dimension should now be measured at the aortic cusps insertion points, using the inner-edge to inner-edge methodology during mid ventricular systole. An example of how to appropriately measure the LVOT dimension is shown in Figure 2b.

As discussed in the last “Tips for collecting video cases” article, we would advocate that a complete study be undertaken for all video cases. This would include undertaking all measurements as described within the 2020 BSE publication “A practical guideline for performing a comprehensive transthoracic echocardiogram in adults”. However, we acknowledge that not all patients will have the “perfect study” and hence, we would accept isolated measurements of suboptimal quality where the measurement is non-essential to the pathology. Where this is the case, this should be clearly stated in the report and the candidate should be able to talk through why certain images and/or measurements have not been undertaken.

Where measurements are missing, the candidate should also be able to talk through how to accurately obtain the missing measurements. An example of where isolated measurements may be left out of a video case may include right ventricular dimensions. If, for a particular video case, an RVD1 and RVD2 measurement can be measured accurately but the RVD3 dimension is challenging and will likely result in an inaccurate measurement, it would be appropriate to include the RVD1 and RVD2 measurement and exclude the RVD3 measurement.

Please ensure you read the marking criteria in full prior to submitting your video cases / attending the practical assessment, as some measurements are critical in certain video cases and need to be included. For instance, the aortic stenosis video case requires an LVOT dimension to be included and if it is not present, it will result in the video case being unsuccessful.

We hope this helps you on your path to achieving suitable video cases, and in your day to day echo practice.

Yours sincerely,

BSE Accreditation Committee.

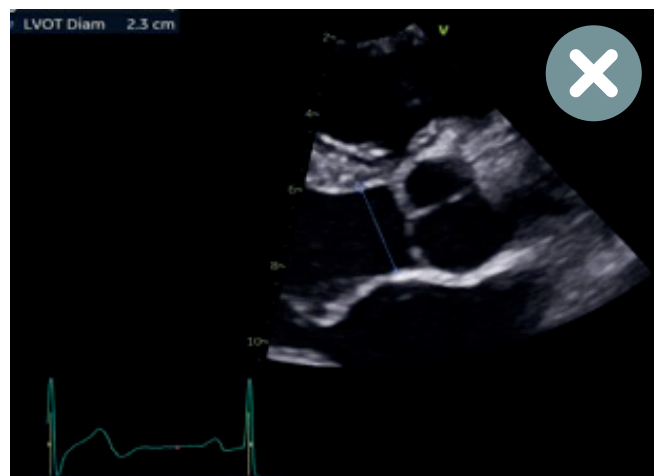


Fig 2a.

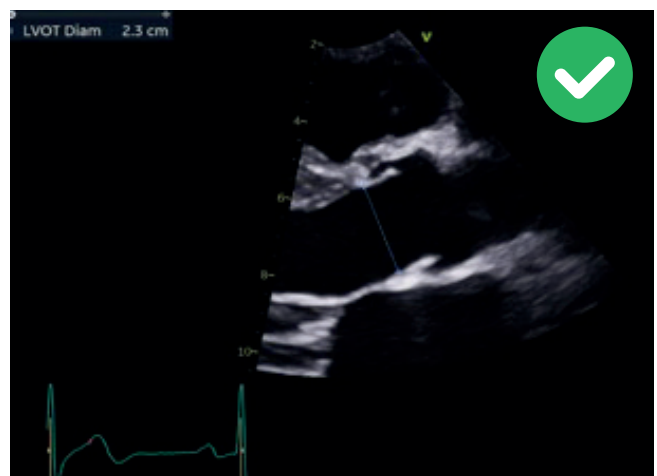


Fig 2b.

References

1. Robinson, S., Rana, B., Oxborough, D. et al. A practical guideline for performing a comprehensive transthoracic echocardiogram in adults: the British Society of Echocardiography minimum dataset. *Echo Res Pract* 7, G59–G93 (2020). <https://doi.org/10.1530/ERP-20-0026>

Top tips for making accurate measurements:

- Optimise images by using the zoom function
- Optimise images by using breath holds
- Avoid off-axis and poor quality imaging views (i.e. avoid using a patient on ICU)

Tips on collecting video cases for BSE accreditation

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In the two previous editions of ECHO (issue numbers 119 & 120) I have given tips on navigating the marking criteria that is used for the video cases at the practical assessment. Hopefully these articles have proved useful in terms of providing examples of good practice for different parts of the marking criteria. In this article I will discuss the marking criteria for colour and spectral Doppler assessment and provide some examples of successful and unsuccessful work.

Colour flow Doppler and spectral Doppler

Colour and spectral Doppler form an important part in the assessment of blood flow direction and blood flow velocities during echocardiography. Therefore, it is important that both of these imaging modalities are appropriately optimised in order to accurately demonstrate normal / abnormal blood flow when assessing cardiac structure and function.

Colour flow Doppler assessment

When assessing colour flow Doppler (CFD) in a video case, we look to ensure that the included CFD images demonstrate:

“Accurate box size, scale and baseline settings demonstrating anatomy clearly”.

During the assessment of CFD imaging, the marking criteria will be successfully met if there are infrequent errors in the use of CFD box size, box location and Nyquist limit settings which allows for the underlying anatomy to be clearly demonstrated. However, if a video case repeatedly shows inappropriate CFD box sizes, box locations or inappropriate Nyquist limit settings, particularly if it impacts on the assessment of the underlying anatomy, the marking criteria will not have been successfully achieved and the video case will be unsuccessful overall.

Examples of adequate and inadequate colour Doppler assessments

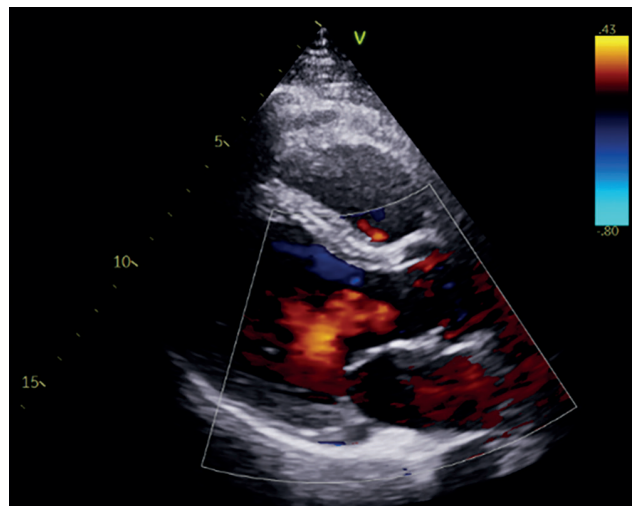


Fig 1a.

Figure 1a shows a colour flow Doppler assessment of the mitral valve in the parasternal long axis view. This image shows an incorrect Nyquist limit setting. The colour flow Doppler box size is also inappropriate and is not solely focused on the mitral valve with both the mitral and aortic valves included. For a more appropriate assessment of colour flow Doppler of the mitral valve, the Nyquist limit should be set at between 50-60cm/s and the colour box should include approximately 1cm of left ventricle on the left lateral border and the roof of the LA on the right lateral border as shown in Figure 1b.

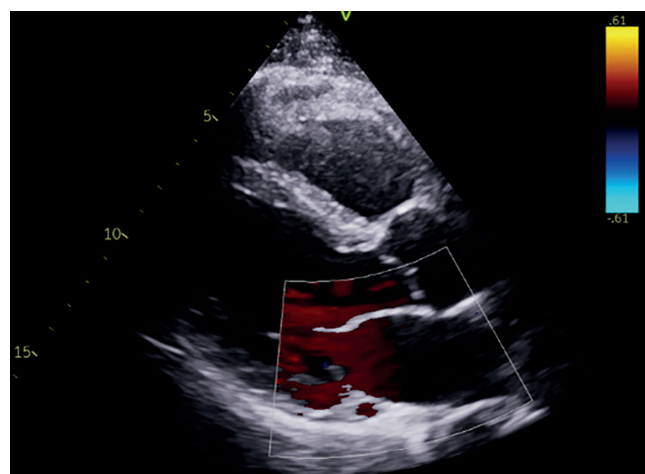


Fig 1b.

Spectral Doppler

When assessing spectral Doppler in a video case, the marking criteria looks to ensure that the spectral Doppler images demonstrate:

“Accurate use with good cursor alignment and optimised waveforms”.

For this part of the marking criteria, if there are rare or infrequent images displaying non optimised waveforms or poor cursor alignment, particularly if the overall assessment is accurate, this part of the marking criteria will still be successfully met. However, if spectral Doppler imaging consistently shows limited optimisation or poor alignment the marking criteria will not have been achieved and the video case overall will be unsuccessful.

Examples of adequate and inadequate spectral Doppler assessments

Figure 2a shows an example of a continuous wave Doppler assessment of aortic valve forward flow in the apical five chamber view. Whilst the baseline has been altered, the overall scale has not been optimised to the Doppler signal as such this has likely contributed to the Doppler trace measurement being overestimated. The underlying 2D image of the apical five chamber is also hindered by artefact making it difficult to assess for appropriate cursor alignment of the underlying structure. **Figure 2b** demonstrates good 2D imaging of the underlying structure and clearly demonstrates there to be good cursor alignment with the aortic valve forward flow. The Doppler waveform is also optimised in terms of baseline and scale settings and consequently led to the Doppler waveform being assessed accurately.

I hope this helps you on your path to achieving suitable video cases.

**Yours sincerely,
BSE Accreditation Committee.**

Top tip:

For Colour and Spectral Doppler:

- Optimise the underlying 2D structure of interest.
- Optimise spectral Doppler baseline and scale to the blood flow being assessed.
- Return the Nyquist limit back to normal following PISA / septal flow assessments.

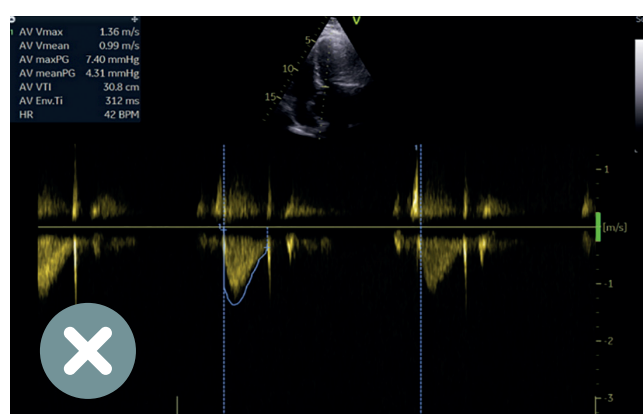


Fig 2a.

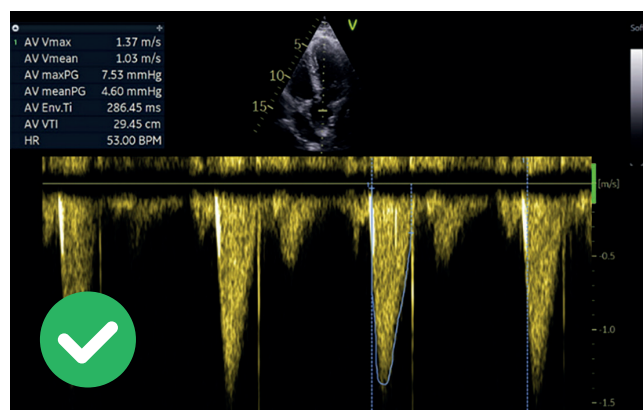


Fig 2b.

Accreditation Clinic

The accreditation clinic is a great opportunity to meet with the accreditation team to discuss anything from written exams to practical exams and even departmental accreditation.

The clinic is run on the first Thursday of every month at 1pm.

Sign up for the next clinic by visiting the events webpage bsecho.org/events

