Interview coding matrices (**5.0** Using and applying a system/framework for interpretation)

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|  | **5.0** Using and applying a system/framework for interpretation | | | | |
| **5.1** Applying system to aid interpretation | **5.2** Barrier to applying system | **5.3** Using paper or calipers to aid interpretation | **5.4** Changing or evolving the system | **5.5** Pattern recognition |
| P2F | In terms of my own system I think I just go through each lead I know. | I’ve been taught to use a system but don’t really know it well enough to reply on. |  |  |  |
| P5M | Yes, in a sense I am systematic. |  |  | I would think so, yes definitely. |  |
| P6F | Yes, a vague one – I start with the P waves, then examine the rhythm and look for ST changes. Once you’ve determined the rhythm you can detect other abnormalities. In terms of using a lead by lead approach I start with the rhythm strip first and then scan the rest for a general impression. |  |  | I used to measure the squares etc and was very systematic but now I don’t need to rely on this. |  |
| P9M |  |  | I’m quite dependent on marking regularity on the paper, same with the QRS complex | Yes, most definitely. When I was less experienced I took a more methodical, A-Z approach. Now I take a general impression to look for obvious patterns first then reverting to system if needed. | then I check whether it’s regular and whether there’s any patterns.  Now I take a general impression to look for obvious patterns first then reverting to system if needed. |
| P10F |  |  |  | Yes definitely, you’re looking for different things when you first learn. With experience you know to look at different areas for information. | I think I rely on patterns seen before, and I’m definitely more aware of pace now. |
| P11F |  |  |  | Sometimes I do [use a system] if I’m struggling – I go back to the basics of rate, rhythm and then wave identification. Now I find I want to diagnose straight away. . .  I used to be very methodical and count squares etc but now I’ve got lazy and expect to be able to look and diagnose instantly. Sometimes this is the case but not always. |  |
| P13M | If I have time then yes, and if I have sheets showing stages to look at with different intervals. I suppose it’s quite a methodical approach. |  |  |  |  |
| P16F | I try to look at the P waves first, then the QRS complex and then have a look at the rhythm, but some things, like the myocardial infarctions, are so obvious your eyes go straight to them. |  |  | Clear features are automatically recognised. That was the way we were taught anyway, I don’t know what it’s like now; follow P waves, QRS complex and then if there’s things like delta waves that don’t follow the rest of the pattern you can make your assumptions then.  I’m not as good at reading them now as I’m so used to the ones I see on a regular basis. I’m not as quick. The majority of things I’d be able to pick up on, but I used to be able to look and immediately identify – it’s not important to me now, the ones in the cath lab are what I’m used to seeing. | but some things, like the myocardial infarctions, are so obvious your eyes go straight to them. Especially as this is what I’m used to looking at. Clear features are automatically recognised. |
| P18F |  |  |  | I suppose you look more when you’re a student and take a longer time to diagnose. I guess you do all the things I’ve forgotten now, like looking at the axis etc. It’s more methodical. I don’t do that now. I just look and diagnose. |  |
| P19F |  |  |  |  |  |
| P20F | First I look to see if it’s normal. If it’s abnormal I work out the rhythm, and morphological abnormalities – 2 separate things really. I usually analyse rhythm in lead II and then look at chest leads for morphological abnormalities. |  |  |  |  |
| P21M |  |  |  | I was taught to break it down into P waves, QRS complexes and axis analysis, and to look at the ST segment and T waves, so go along bit by bit. Also the rhythm, i.e. how regular it is. I’ve moved away from this system though, I find I can glance and recognise what is abnormal. | I find I can glance and recognise what is abnormal. |
| P23F |  |  |  |  |  |
| P24M | You have to be quite systematic, so generally I’d always want an ECG with a rhythm strip. Some of those didn’t have a rhythm strip. I’d look a rate, rhythm from the rhythm strip (are P waves present, what’s their relationship to the QRS complex) then occasionally I look at the cardiac axis although that generally not very useful for rhythm interpretation and then I look at the chest leads for morphology of the QRS complex and T waves. |  | I tend to use calipers, so if I don’t know where the P waves are I mark them out. I rarely have calipers with me though so I use a piece of paper. |  | Some of them are pattern recognition but if you’re not sure what’s going on then you have to use a systematic approach.  If you’re used to using pattern recognition then it’s easy to miss things, or if there’s more than one abnormality then you’ll generally focus on the main one. |
| P25F | The first thing I always go for is - is it dangerous? Do I need to go screaming for a doctor, i.e. is it VF/VT or atrial systole, complete heart block, are they passing out, how’s your patient – that sort of thing. Then I break it down bit by bit; what’s the rate, is it bradycardic/tachycardic, is it within normal limits, what’s your P wave – is it tall, wide? What’s your PR interval, 1:1 conduction? What’s your QRS like, is it notched or something like that? I take it step by step. Yes, I’m relatively systematic.  it’s nice to be systematic. If you go through step by step you’ll answer it without even knowing. |  |  | You’ll be quicker and they’ll be more that you answer straight away. Like the SVTs, they’re quite complex – it’s an umbrella term and you just take it to someone more senior. You only start learning what type of SVT it is at a later stage. | . Some I can just look at and know straight away – like VF. |
| P26F | I start off with the P waves and the QRS complexes but when you see AF, because I know there’s no P waves and the pattern, is automatic. The same with atrial flutter. Then I look at the shape of the QRS complex and how broad it is and ST segment. Because I’ve been doing it for a long time you tend to pick things out – there’s one that looks like it might be VT |  |  | Yes, definitely. We train the students to have a sure fire way of doing it but as you develop with the years people drop things. Some senior people wouldn’t know how to look at axis on a quick analysis. | but when you see AF, because I know there’s no P waves and the pattern, is automatic. The same with atrial flutter. |
| P27F |  |  |  |  |  |
| P28F |  |  |  | When you’re learning you’re very thorough, you start with each beat and you go along. You think you look at it overall. For certain rhythms you know to look at a certain lead or if you see something immediately, like myocardial infarction, your eye gets drawn immediately to that area. You know to look in certain areas for certain things. |  |
| P29F | I tend to always go for V1 first to see if there’s any bundle branch blocks and you can see the complexes clearly, and then I always go for the rhythm strip along the bottom which is usually lead II. |  |  |  |  |
| P30M | Straight away, I have a very simple checklist. I need to make sure it’s the right name for the right patient, that’s the first thing I look for. I never treat the ECG, sometimes you can lots of movement that replicates other things but if the patient is talking to me I know they’re not in VF – that’s very common sense. Next it’s rate and rhythm, you look at whether it’s fast or slow and whether the rhythm is regular or irregular. Obviously dangerous arrthymias come up very high. After that it’s a logical approach – is there a P wave for every QRS complex, after that you’re looking at the QRS complex themselves, ST segments, the axis if you wanted to know about the axis, and then at the end of that you should have logically gone through everything. |  | Yes, to confirm second degree heart block I’d need to mark if with a marker to see if the P wave is regular or not. | Yes, although it depends on your sub specialty. If you’re an electrophysiologist then you focus on the electrical features of the ECG, you focus more on V1 and V6. WPW would stand out very quickly as you’re used to seeing it. If you’re an interventionist you may have to be more systematic with your approach as you don’t see as much – they see ST elevation and ST depression. Certain sub specialties look for certain discrete features in certain areas of the ECG but I teach my students to go through every lead from top left to the bottom right. That’s what I teach them but I don’t tend to do this, I tend to look towards V1 as a starting point because I know I can check the rate and the rhythm there and then I go and look at the axis and work from there. By the time I’ve done that I’ve looked at the axis and know what I’m looking at. | ECGs are all about pattern recognition and if you’ve seen enough and know enough then you should be able to get them.  If you’re an electrophysiologist then you focus on the electrical features of the ECG, you focus more on V1 and V6. WPW would stand out very quickly as you’re used to seeing it. |
| P31F | The first thing I look for is rhythm, but then that’s my specialty, so I look for that first and then I look for the morphology after that.  *Do you have a system?* No. |  |  |  | Lack of basic knowledge about morphology shapes as well. |
| P32M | You have to do an overall interpretation so try and do rate, rhythm and then morphology – see if there’s any prolonging of the QRS or ST elevation. It depends on the context. | I still try to be systematic but the more experienced you get the more you rely on pattern recognition. |  | Yes, definitely. I still try to be systematic but the more experienced you get the more you rely on pattern recognition. You’re still aware that you can miss things though so I try to go back and be systematic. If something strikes me as obvious in the first instance then I might just accept that or I might go back and have a closer look. | Yes, there’s a lot of pattern recognition. LBBB jumps off the page at you and you don’t need to say much more than that. Some of them where I didn’t know what the rhythm was which made it harder. When things look a bit strange, like left ventricular pre-excitation, then you might take a minute to work out what’s going on. There’s a lot of pattern recognition. Sinus rhythm jumps off the page at you but other things take a bit longer.  Yes, definitely. I still try to be systematic but the more experienced you get the more you rely on pattern recognition. You’re still aware that you can miss things though so I try to go back and be systematic. If something strikes me as obvious in the first instance then I might just accept that or I might go back and have a closer look.  Yes, it depends what you’re doing. Students sometimes can’t tell the difference between LBBB and right bundle branch block. The only reason I can tell is pattern recognition, helps me to recognise the distinct differences between them |
| P33F |  |  |  |  | I look at the name, the rhythm and the rate, and then you look at the intervals, the QRS duration and the QRS morphology and the ST segments and then you look at obvious patterns – pattern recognition. |
| P34M |  |  |  | I would say that the more experienced you get you train yourself to only look at the important things. So when you first learn you go through a long protocol of breaking an ECG down bit by bit and then the more experienced you get the more you start looking for significant things. In those ECGs you go through the main points but things like prolonged PR intervals, left axis deviation you tend to skip over and you just concentrate on the other more relevant stuff. |  |
| P36F | It’s systematic really, and then you look at your rhythm strip to determine rate and arrhythmia. |  |  | Yes, in your early days you have to be a lot more systematic in your approach, you have to start with P waves, measure out intervals etc and you need to spend a lot more time analysing them. With experience you can know just by looking what’s a normal rhythm and things. | Yes, in your early days you have to be a lot more systematic in your approach, you have to start with P waves, measure out intervals etc and you need to spend a lot more time analysing them. With experience you can know just by looking what’s a normal rhythm and things. |
| P37F |  |  |  |  |  |
| P38F | The first thing I look for is the P wave, then I look at rate and conduction and then the ventricular complexes. |  |  |  |  |
| P39F |  |  |  |  |  |
| P40F |  |  |  |  |  |
| P41F |  |  |  |  |  |
| P42F |  |  |  | you just look at them and something jumps out, and then you go back and look at other things. Sometimes if you don’t really know what’s going on, or it’s not obvious what’s going on, then I’ll just go back to using the basics. | you just look at them and something jumps out, and then you go back and look at other things. |