Interview coding matrices (**1.0** Barriers to making an interpretation)

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|  | **1.0** Barriers to making an interpretation | | | | | |
| **1.1** Presentation of the ECG | **1.2** Artefact | **1.3** Forgetting skills over time | **1.4** Fear, panic or pressure (stress) associated with making an interpretation | **1.5** Finding it difficult to make an interpretation | **1.6** Errors and mistakes |
| P2F |  |  | Being taught the system did help, but I find unless I’m regularly reading ECGs and have instruction I forget how to use the system and interpret them. | I suppose when looking at them in first and second year I’d panic and not know where to look. | Really hard, but I’ve always found ECGs difficult! | I’m not sure I’ve really had enough experience to make any significant errors.  I suppose lead inversion? And not knowing which waveform is which. |
| P5M |  |  |  |  | The simple things, like AF/VT are noticed quite easily. But congenital problems, like long QT, right heart failure etc, require more time and are harder to interpret. | If I don’t know the patient history it can be problematic, as some patients have other problems that different tests can detect – ECG can give lots of information but they can also mistake stuff. For example if an athlete comes in with 40 bpm, we would assume bradycardia. But this would be wrong, for this patient that is normal. It’s important to know context before interpreting.  Sometimes you don’t think logically, as there are so many things to think about. |
| P6F |  |  | Then again, I find it’s a skill I forget if I don’t use it. |  |  | . . .sometimes I get atrial fibrillation and atrial flutter the wrong way round. |
| P9M |  |  |  |  | . . .there were some tricky ones though.  I find distinguishing between atrial fibrillation and atrial flutter quite difficult. | I find distinguishing between atrial fibrillation and atrial flutter quite difficult. |
| P10F | Some of them needed a better rhythm strip for more info, as the baselines were a bit funny on some. |  |  |  | There were a few tricky ones in there, it was quite hard actually! I’d give it a 4/5 for difficulty. |  |
| P11F |  |  |  |  | Now I find I want to diagnose straight away but these weren’t in the context of everything which was harder, you get v. used to having clinical history. |  |
| P13M |  |  |  |  |  | I suppose limb lead errors, like inversions. |
| P16F |  |  |  | Stressful, the majority of it’s easy it’s just knowing what the answers are. | people of Afro-Caribbean descent have ECGs that naturally have ST elevation so it looks like they’ve had myocardial infarctions. With the primary PCIs recently introduced we get a lot of ambulance staff diagnosing ECGs en route, and people coming in thinking they’ve had heart attacks and they haven’t. | Believe it or not I’ve never made any errors until today! |
| P18F |  |  | *Is it a skill if you don’t use you forget?* Yes, definitely.  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 |  |  | I’ve been taught to look for the 5 dangerous rhythms – myocardial infarction, SVT, VT, atrial systole and 1 other…I can’t remember. | I was a bit nervous as I felt on the spot. I felt pressured due to the time constraints |  | When you look at an abnormal ECG and recognise it’s abnormal but don’t seek a second opinion. |
| P20F |  |  |  |  | Really hard! | Perhaps when you find something, not to carry on looking for other things? |
| P21M |  |  | My interpretation isn’t as good as it should be.  *Is it a skill that if you’re not using you forget?* Oh yes, definitely. | I was quite nervous. |  | I think I got most of them wrong to be honest. |
| P23F |  |  |  |  | Quite hard, well…some of them were ok but I’m still a student.  I look at it and think it’s one thing and then see something else so become unsure.  I guess sometimes SVs and sinus arrhythmia and Junctional rhythms and things like that where it’s an unusual rhythm that you don’t see very often – rare things I suppose are difficult to detect. |  |
| P24M | Normally I’d look at them more, not used to looking at them on a screen.  I’d always want an ECG with a rhythm strip. Some of those didn’t have a rhythm strip. |  |  |  | Some of them I couldn’t quite work out, I was trying to look for P waves and things and couldn’t always see everything that I wanted to. | 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. If somebody’s got LBBB you just focus on that and can sometimes ignore rhythm and whether they’re in complete heart block or something. |
| P25F | There weren’t all the measurements so if I’d had those I’d have been able to figure it out a bit more. |  |  | Ok, it was a bit weird because you see them every day but the added pressure. Really studied it but was aware you were watching my eyes!  You do feel the pressure of wanting to get it straight away but if I sat down with it and really studied every little bit you’d probably get to the answer. |  | There are some tricky things that you don’t see very often, in my 4th year exams there was something I got wrong that I should have got right. Like Brugada syndrome, can be mistaken for an anterior myocardial infarction |
| P26F | I find it difficult on screen as you’re used to looking at it on paper. The heart block you like to measure it out to see whether there’s association or dissociation with the QRS complexes. Some things are a little bit more difficult on screen than they would be on paper. |  |  |  | I find it difficult on screen as you’re used to looking at it on paper. | Assumption is the biggest. People have a set idea of what they think it is and they may be wrong. A patient history may influence this. Without knowing the patient history you may take more from an ECG. |
| P27F | It’s unnatural on a screen, I like to count out the squares and have a bit more time to work things out. | Artefact is one that can often be made into something it’s not. You can see things that aren’t there. | Majority of experience has been block weeks which has been helpful, they were at the beginning of the year and then we have placements. The block weeks were good but they were a long time ago and when you have university you forget. I need to keep going over it.  *Is it a skill if you don’t use you forget?* Not forget, but there’s just so much information. | I’m systematic when I’m not under pressure. | Hard, I seem to forget a lot of things under pressure.  Sometimes the subtle things are hard | Especially when you’re leaving. Sometimes the subtle things are hard, or over thinking when it could be something really simple. Artefact is one that can often be made into something it’s not. You can see things that aren’t there. |
| P28F | Some of the ones you’ve included have a wobbly baseline but you need to be able to see through that so it’s good you’ve got a few of them on there, because if you can’t see P waves and have an irregular rhythm you need to be able to see that baseline to determine what’s going on. That can be tricky. | Some of the ones you’ve included have a wobbly baseline but you need to be able to see through that so it’s good you’ve got a few of them on there, because if you can’t see P waves and have an irregular rhythm you need to be able to see that baseline to determine what’s going on. That can be tricky. |  |  | because if you can’t see P waves and have an irregular rhythm you need to be able to see that baseline to determine what’s going on. That can be tricky. |  |
| P29F |  |  |  |  | Ok, moderately difficult. Some of them you knew straight away but others were more tricky to decipher. |  |
| P30M | Difficult as there was no heart rate, that often allows me to identify a quicker rhythm.  Some of your ECGs you’ve only got 1 complex from 1 lead so it can sometimes be a bit difficult if you can’t see anything else from that lead. | 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.  The top common error is not being able to recognise simple concepts of artifact. That’s a common error. |  |  | Difficult as there was no heart rate, that often allows me to identify a quicker rhythm. | The top common error is not being able to recognise simple concepts of artifact. That’s a common error. Also things like if one lead shows me a wandering baseline that’s a little bit irregular that looks like AF and the other leads don’t show that then you mustn’t just look at one lead – you need to be able to take the whole picture.  When you’re trying to do it fast you can miss all those things, subtle little changes. If I did it again I’d probably do it a little bit slower. |
| P31F |  |  |  |  |  | a lot of people get AF and atrial flutter mixed up, and there’s no need to as flutter is a specific shape but fibrillation can fox you. That’s one major thing. Lack of basis knowledge about morphology shapes as well. |
| P32M |  |  |  |  |  | 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 2. Some people don’t look at all the leads when things aren’t immediately obvious. |
| P33F | There was one ECG that was really zoomed in, because some of the leads were missing and there was no rhythm strip I couldn’t decide. It’s not a natural ECG to look at, I’d have liked to have a longer rhythm strip to look at. |  |  |  | Ok, except that asking for a unified diagnosis from a snapshot ECG is not easy. | Yes, the common errors are that without a clinical setting you shouldn’t really be making a diagnosis but people commonly get some of the rhythms mixed up. Like the 3 to 1 heart block\complete heart block – it probably was complete but I couldn’t see that. The conduction, the 1 to 1 relation of the QRS can be commonly mistaken. Fibrillation can be commonly mistaken with ectopic beats, ST changes can be commonly mistaken with hypertrophy. The schoolboy error is making sure the leads are correctly connected. |
| P34M | Ok, I don’t know if I looked at them then how I would normally. It’s a bit unnatural having them on a screen and having people sat here watching me. I’m probably doing it different to how I would do normally. |  |  |  |  | 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 | Ok, some of the ECGs aren’t uniform, which makes it harder. It’s not laid out like a normal 12 lead. |  |  |  | I think a lot of ECGs can be very complex, you can look at it (like an SVT) and not see things. It all comes down to experience and how frequently you’re used to looking at them. |  |
| P37F | It’s fine, it would be easier if you could draw on them. Trying to look at them quickly and count your squares is really difficult. I feel like I’ve got 2 people watching me so it’s more pressured! | it depends on who’s doing the ECG. If they don’t get their position’s right then you can think there’s something on the ECG that isn’t there. | It’s still there, I still remember bits and pieces of it but maybe not as good as the others you’ll get coming in, they’ll be seeing them on a regular basis. If you’re not using the skill you lose it; you have to really focus to see what’s going on whereas the others will just be able to look at it and know. | I feel like I’ve got 2 people watching me so it’s more pressured! |  | it depends on who’s doing the ECG. If they don’t get their position’s right then you can think there’s something on the ECG that isn’t there. The biggest thing that I noticed is that people think they can do ECGs but there’s no level of training there. |
| P38F | there were 1 or 2 I’d have liked to have seen on paper. | A lot of the time people see artifact as atrial conduction and will say it’s AF when it isn’t, it’s actually sinus rhythm. The first thing you do when you do an ECG is make sure you have really good contact. |  |  |  | A lot of the time people see artifact as atrial conduction and will say it’s AF when it isn’t, it’s actually sinus rhythm. The first thing you do when you do an ECG is make sure you have really good contact. After that, everything should be fine. |
| P39F | It’s different looking at ECGs like this. It isn’t about it being unnatural, it’s very interesting. I don’t know, if this helps with future development of technology or something then it’s worth it. |  |  |  |  |  |
| P40F |  |  | *Is it a skill you loose if you’re not using it regularly?* Yes, definitely. |  |  | Yes, lots. Off the top of my head it’s quite difficult to say but rhythms are often quite difficult. |
| P41F |  |  |  | A bit intimidating, ok but I probably answered them a lot quicker than I might have done – I felt a bit more under pressure than normal.  It depends, the more junior you are you just look at the ECG and don’t look for P waves whereas that’s generally the rule of thumb – look for P waves. I don’t think people always do this. And panic as well, which I did. That was horrible! People might panic and not look for the basis P wave, latch onto the first big thing they see. |  | It depends, the more junior you are you just look at the ECG and don’t look for P waves whereas that’s generally the rule of thumb – look for P waves. I don’t think people always do this. And panic as well, which I did. That was horrible! People might panic and not look for the basis P wave, latch onto the first big thing they see. They might look for the complicated thing without looking for normal sinus rhythm first. |
| P42F | Initially I start off looking at the whole thing and then I panic, and move to the rhythm strip. Not all of those had rhythm strips so it was a bit more difficult. |  |  | It’s quite stressful being put on the spot, I guess a very small amount you’re more conscious of where your eyes are moving. Overall I think it’s quite similar to if someone on the ward just stuck and ECG in front of me and put me on the spot, I’d be all over the place trying to get something and then trying to focus on one area.  Initially I start off looking at the whole thing and then I panic, and move to the rhythm strip. | Not all of those had rhythm strips so it was a bit more difficult. | I think sometimes you miss things if you get sucked into something crazy going on and you just focus on that, you miss something else in other parts of the ECG. |