Appendix 1. Selected surgeon responses to assessment moments

Step	Response to Variation
1. Taking bowel down off the abdominal wall	URS07: "They're essentially **mowing through everything (too quickly),** so I'd like to see that they actually make a bit more of a triangle and push at the apex underneath here and then, once they do that, they can see the avascular plane and then you can essentially tear it." URS11: "**His technique is just very slow** just for him to go through that tissue. There's not much blood vessels in that tissue." URS10: "I think this part is fine. **It could be faster**. He could use that second instrument better….He could use it to grasp it. He does it kind of pushing back on it…it would help him move faster…(but) it's not a big deal." URS05: "I wouldn't have done it this way. I would say that everything is done safely... (But) the tension planes are not optimized. The visualization is not optimal because the way that they are holding (the grasper). When I see the grasper, floating there, I want to kill somebody." URS03: "I don't use a [type of grasper] but it's not an error. It's that if you're doing the case with me, I'm inflexible [on that]." URS04: "When the surgeon has laparoscopic tools in the abdomen, they should always be visible and what I didn't like here was the one on the right hand was being occasionally outside of the visual field." URS06: "I would've liked him to be retracting the bowel more medially… Also, I would like it better if he would develop the plane back there (along the abdominal wall) better." URS01: "Nothing bad is going to happen there." URS02: "I think it looks pretty straight forward…they're developing the plane, they have counter traction, so no issues."
2. Taking bowel off the kidney	URS04: "It looks like you could've tented up a little bit more on that tissue to **put a bit more stretch on it and thin out the tissue**." URS06: "I think this is good…**Some would argue that this is not a dissecting tool**, the harmonic, and I think there's kind of two schools of thought on that…it's fifty-fifty in terms of who thinks this is a dissecting tool or not because it's hot. (That) the harmonic is not a dissecting tool. But I don't think it's illegal to do it, it's more of a preference." URS05: "I think this is done well. What I'd like to do is I'd like to see this arm be active to show us both sides, to make sure the spleen's okay. **I would have taken the plane a little bit higher**. That's just a thing I like to do." URS11: "He's being very safe to stay well away from the bowel, which is fine. It's taking him a bit to go through that…**(but) he's being very safe**. You can tell that." URS10: "I don't know how well he's using the harmonic. It's sticking a little bit longer than it should, so I don't know what his power settings are on that, but not anything which I would say is very bad." URS02: "The counter-traction is maybe a little bit of a different angle than ideal but it's pretty good. It's acceptable." URS03: "Reasonable distance from the bowel with the harmonic."

3. Isolating ureter from retro-peritonteum	URS11: "He's been dissecting a bit with the sucker. Now, this is just a preferential thing. I personally don't like to dissect a lot with a sucker. I like to control all the blood vessels with a harmonic or fulguration." URS03: "I don't like tearing tissue with the sucker. It pisses me off…I'm an absolute fanatic about hemostasis during the case, all the way. I would use the sucker similarly but create column of those small vessels there that are starting to tear, then I would harmonic them." URS08: "He or she was doing that dissection just bluntly and tearing the tissue and… there was creation of a little bit more bleeding than there needed to be…I was a little bit uncomfortable with that" URS09: "I'm not comfortable with that." URS01: "**There would be a little bit of bleeding that would be easy to control because you are in a wide open space** and you can see it and it wouldn't be torrential. **That's okay**." URS04: "I do see some of my colleagues…use the sucker on occasion to dissect things, so that probably is where they trained and just their preference. I think generally speaking, you don't want to use a blunt tool to do sharp dissection, which is what's going on there, so probably a better tool would've been even quicker." URS05: "**Theoretically, you don't need the gonadal**. He's in the wrong area. He shouldn't have even been there in the first place, but maybe I'm being picky about that. I'm particular about the way that we do this." URS06: "**I think he's developing a plane. He's using his sucker**. He's got good retraction… It would be better if he had the ureter and gonadal vessels together, rather than separated." URS07: "**I like separating the gonadal and the ureter**. This something that residents and trainees will get themselves into all of the time, where you got the gonadal vein up and the ureter behind, but if you carry that up towards the hilum of the kidney, it would be in the wrong place because the gonadal inserts into the renal vein." URS10: "I don't see anything much wrong there… if they're going to divide the gonadal, it's probably better to do it and then trying to find that ureter." URS02: "It all seems fine. I didn't notice anything there."
4. Dissecting kidney from spleen	URS07: "I don't like buzzing under water, my preference would be to get the suction in there and suck, so they actually know. The adrenal gland is going to be right there and if you mow through that, then you'll look back at the procedure differently." URS08: "There were instruments that were being placed without complete visualization" URS09: "**I'd be very uncomfortable with it**…just going in and then using the harmonic right away and then teasing it off. I'd be worried about that." URS04 "He had no idea where he was there. He just buried it and didn't really kind of see where the tips were, so that just kind of a very basic laparoscopy to know where the tips of your instruments are." URS03: "This is a mess. He's got the spleen up. He's had bleeding. He's got gauze there. He does not have the kidney on stretch, which is a disaster. And **he's working on upper pole vessels that he doesn't need right now**." URS05: "I didn't like this part. I think here, it's a little bit unclear, in terms of where things are because the spleen is here, pancreas is here, **he should've developed this plane a little bit more**… I kind of use a different instrument to kind of create a plane, so that way I know what we're taking." URS10: "It's an approach thing, right. I leave all those attachments there…People may do it differently, but I just think (cutting the attachments now) it makes it harder." URS11: "Obviously, the spleen was injured, so that would be a big big no no…in terms of the dissecting on the upper pole, he is getting a little bit close to the capsule of the kidney." URS01: "**They're being careful, which is, in a way, saying 'tentative.' But that's not a bad thing**." URS02: "Nothing special there, in terms of technique."

5. Isolating renal artery	URS10: "The direction he passes that right angle can be better. He's going kind of parallel to the vessels…Sometimes, I just use a Maryland. (But) a right angle can be used as well…(And) he has to use that retractor to pull it up. He's distressed the vessel." URS11: "It looks like there's a bit of bleeding, so I would be a bit concern with that. His technique here is something that I personally don't like… It's nice when you spread the vessels this way (horizontally)…(And) you have to use a right angle." URS04: "**I think the (right angle) is okay, probably the one I would use** typically when I do this but I didn't like the way it was spreading parallel to the vessel because the vein is really close there and you don't know if there's another vein underneath it." URS06: "He could've used a different instrument here instead of the right angle**. I think the Maryland would've been a better way to dissect out the artery**…Efficacy of this instrument isn't correct at this spot." URS03: "He's using a right angle. That I don't use. I don't let the residents use this one with me... **You don't bring out this instrument in my case**." URS02: "I'm happy with that… with a bit of fat there and stuff probably the right angle is the (better) thing to use." URS05: "There's no tension on the artery… The artery's bowed. See how it's moving around like that? So he needs more tension. He's done it safely. **He's using the right instruments to do it**. He just doesn't have his left arm in the right place." URS01: "There was one or two points where some instrumentation went down--on not a not totally clear field of view--cauterizing and things like that." URS08: "The thing that I saw that made me uncomfortable was the lack of exposure." URS07: "I like the fact that the vessels are being isolated quite a bit."

6. Stapling renal artery	URS10: "I think this is like the key step which makes me worried…because he's going into the artery there. He doesn't see the tips of his instruments, where they are. And he's fired it without actually seeing where that is." URS11: "I don't think I'd ask them to put another port, but I probably would've got them to dissect up here above the artery and vein… or you can adjust the camera angle… **I would be uncomfortable. I would like to see that better. It's hard to see where he's going**." URS09: "I don't like that either…you can't see anything. He could be cutting through anything… (And) **I probably would've used three [clips] personally, but I know some people use a stapler**." URS02: "Assuming they got around it with the [tool], that's okay. **They checked to make sure that the tips are past and free.** I didn't really see it that well myself but I assume they must have seen it… nothing really jumps out there too much." URS04: "I think at some point he started retracting here and I think someone was telling him, 'do you know where that is? Can you see the tip?' It's kind of after the fact and even then, he didn't. That's a very basic skill that you've got to know where those tips are before you apply the tool and that is not a safe manoeuver." URS08: "I wasn't comfortable with where they were applying the staples, I couldn't see the end of the clip applier. I thought the exposure was really suboptimal and then it looked like instruments were being pushed in blindly, so I would be uncomfortable." URS03: "**The risk of having all those clips in the hilum is when he goes to fire his stapler**…if he had a clip in the jaw inadvertently, that will do a stapler misfire and he would have uncontrolled bleeding." URS05: "I like this thing. It's nice to know there an eclipse behind (the stapler) ...I like this, what he's done here to push the tail of the pancreas off to see….I like the use of the stapler this way… (And) I like the fact that this guy is cutting the artery several times." URS06: "More retraction, put the retractor between the artery and the vein here and if you put it like that, then you can see the artery directly and then, you can see what you're cutting. …(And) I didn't like the fact that when he cut, he seemed like he was struggling cutting…you should be able to cut that in like two or three (snips), but the efficiency of the cut took forever." URS07: "So I use the endovascular stapler…but I think it's just a matter of…preference in staplers. **So if this trainee chose that stapler I would not be happy**…For something that important, I am not willing to compromise…They need to do it how I want them to do it, because I find that this is where patients can be harmed. Whereas everything else really aren't in my area of concern…but in this, if they get bleeding or they don't staple properly or the staple misfires, then, it could be disastrous."
7. Stapling renal vein	URS04: "What I really didn't like here was the way he's sort of tenting up. **That vein is so easy to tear and he's really moving around quite a bit there**." URS06: "On the vein, you should actually wait fifteen seconds after you clamp the vein, so I think he only waited eight… That should be not a preference but that should be a principal." URS02: "They say 20-30 seconds sometimes but most people put it on for 5-10 seconds and then staple. Especially, the vein. The vein's pretty thin tissue and it doesn't need a lot of compression." URS03: "The length of time doesn't matter to me" URS05: "**I thought this was done very nicely. I like what he did here. He just got around the vein very nicely**, showed us the other side." URS10: "**No concerns here**. Like the amount of time with the stapler on the vein and I like the way he's pulling it toward himself to see the tips." URS11: "That was much better because you can see the tips coming across."

8. Using gauze to improve hemostasis	URS03: “That drive me apeshit. Because **that’s poor technique and blood pooling eats your light**, so it reduces your luminescence within the abdomen and you don’t see as well. Then you make mistakes.” URS06: “Placement for the [gauze] would’ve been better if he actually spread it out, like instead of just wedging it in like dirty clothes in a hamper, would’ve been nice if he just spread it out like a rug.” URS01: “You don’t need to do that routinely. There must have been a little bit of oozing there that they were worried about to put that down.” URS10: ““I think this is fine if it’s necessary. If they see oozing or they’re not comfortable then I’ll let them do this. If they just answer that they’ve seen it before with someone else, that’s not enough to justify it. They have to be able to explain why… why the extra 5 minutes to do it, why the extra expense, why the extra step.” URS02: “It’s not a life or death type of step. Some people like to leave the bolsters out, that would be a preference.” URS04: “**I think that’s a preferential thing. I don’t think some surgeons ever routinely use or hemostatic agents or others do not.** They simply observe the wound and if it looks like there’s pretty good control, then they don’t use it.” URS05: “Now they're just establishing hemostasis. I like the way that they’ve done this. **This looks good**. He’s knocking on the spleen a little bit but this is a very good technique that he’s used.” URS07: “I like putting [gauze] on the bed.”