

October 10, 2022

Reviewers Comments to Author and Responses:

Reviewer: 1

1. How much area and force (such as pascal) are applied to the gastrointestinal mucosa and to what extent does the mucosal injury? It would be interesting to have data and reports on these points from in vitro and/or ex vivo.

Response: We agree with the reviewer that it would be interesting to have data on the physical force of water jet. We have performed a literature review on the mechanical data of water jet, including the force on colon mucosa. However, we could not locate any in vitro or ex-vivo studies to provide this information.

2. Is it possible the mucosal injury occurred following over insufflation?

Response: We thank the reviewer for raising the possibility of barotrauma from insufflation. Typically the lesions caused by barotrauma are red linear streaks arranged in parallel pattern, or the “cat scratch sign” (*Endoscopy* 2007; 39(5): 459–461). We did not suspect over-insufflation in this case because as seen in Figure 1A, there were no red linear streaks, but there were mucosal flaps caused by pinpoint injury.

3. The endoscopic image of the cecum with mucosal injury is showed in Fig. 1A. Please show the image of the cecum when it is reached, instead of the image of the transverse colon.

Response: We do not have the image of cecum when it is reached because there were debris in the cecum and the endoscopist did not want to take a photo of the cecum until the cecum is cleaned with water irrigation. Once the

endoscopist started cleaning the cecum, the only image obtained was with mucosal injury from water jet.

Reviewer: 3

1. Because this adverse event was induced by malfunction of the water jet/endoscope, can we (endoscopists) figure out the malfunction before the screening procedure? If we can, we can avoid the iatrogenic injury. Please discuss this in the "Discussion".

Response: This is an excellent point raised by the reviewer. In our endoscopy unit, all endoscopes go through routine maintenance and processing as recommended by the manufacturer. Nevertheless, endoscopist or endoscopy lab staff should still check the endoscope and water jet before procedures to make sure the instruments function normally. In order to recognize the narrow water jet stream with high-pressure during the instrument check, awareness and vigilance are required. In addition, more studies are needed to identify the threshold of water pressure that the mucosa can withstand without injury, and then check the water jet and pressure before procedures. We hope that the publication of this case report will increase awareness of this uncommon but important issue so it can be detected before procedures. We have added a new paragraph with the above sentences to our Discussion section.

2. Was there any risk factors for water jet/colonoscope malfunction, such as no maintenance or check for a long time? Maybe we can discuss it.

Response: In our endoscopy unit, all endoscopes go through routine maintenance and processing as recommended by the manufacturer. We have added the above sentence to the new paragraph in the Discussion section.

3. It is suboptimal to shown personal communication in the discussion part, as the grade of evidence is low.

Response: We agree with the reviewer to avoid personal communication. However, upon literature review, we did not identify any similar cases of iatrogenic colon mucosa injury from water jet malfunction. Hence, we reached out to the manufacturer to see if they had internal unpublished data on this issue that was not reported in the literature.

4. Was there a relationship between mucosal injury with the polyp 3 months later, as they were at the same site?

Response: The polyp resected during follow-up colonoscopy was a 2 mm size sessile polyp located in the cecum confirmed to be a tubular adenoma. It is unclear if the mucosa injury from water jet was associated with this polyp. Alternatively, it is possible that this polyp was not seen during the index colonoscopy due to mucosal injury limiting endoscopic visualization. We have clarified this in the section of “Outcome and follow up”.

5. It would be better the authors provided Video to show the dynamic injury.

Response: We agree with the reviewer that a video would demonstrate the injury better. Unfortunately, the case was not video recorded because the endoscopist who performed the index colonoscopy did not suspect water jet mucosal injury. We only have pictures taken during the procedure.

Reviewer: 4

1. Please avoid redundant data, throughout all the sentences of the manuscript.

Response: We have revised and eliminated redundant data in manuscript.

2. Abstract: Please insert the age of the patient and that she had no known past medical conditions. Please insert abbreviation "Pt" before using it. Please mention that only the caecum was affected (in: "...damaged the colon mucosa"). Please mention that it was "oozing bleeding", as it appears in the main text.

Response: We have reviewed and revised the sentences in the text as suggested by the reviewer.

3. Case presentation: History of present illness: a. Could you please show the image of the piece of rubber? This is highly important. Without it...there is no evidence. And, please, where did it come from, more specifically? b. "Later in the same endoscopy unit, during a colonoscopy on another patient, a different endoscopist found that the water jet of the colonoscope" – please insert "same" before colonoscope. In fact, it appears now that two cases were injured. Maybe you could present also images from the 2nd case.

Response: We appreciate the reviewer's comment. The malfunctioned scope was sent to endoscopy maintenance facility outside of our institution for repair. Unfortunately, the technician at the facility did not take a photo of the piece of rubber, which was a component of the scope which broke off and lodged there. The technician did report that once the piece of rubber was removed, the water jet pressure normalized and the scope functions normally.

The second endoscopist did not realize that the same colonoscope was used until after the procedure. We have clarified this by adding "after the procedure" in the sentence following. The second endoscopist recognized the water jet malfunction and stopped using the water jet soon after the

procedure started. Therefore, the mucosal injury from the second case was minor and not significant enough to be photographed.

4. Discussion: Please mention whether the functions of the colonoscope were checked before the maneuver. If so, at least, in the 2nd case, the lesions could have been prevented. Otherwise, the conclusion “Endoscopists should be vigilant to recognize potential endoscopic malfunction.” has no relevance. Please also correct: “Although this incidence” to “Although this incident”.

Response: In our endoscopy unit, the protocol is to perform a routine functional evaluation of the scope by our endoscopy technicians and this was performed prior to both colonoscopies. However, the water jet malfunction was not realized until during the second colonoscopy by the endoscopist. Therefore, the technician would not have been able to detect the scope malfunction before this realization. We hope that the publication of our case will increase awareness of this issue so endoscopists or technicians can recognize the scope malfunction before procedures in the future. We have replaced “this incidence” with “this incident” as suggested by the reviewer.

5. Please insert Authors ORCID Numbers.

Response: We have added ORCID numbers for authors. Parth Patel, MD – ORCID number 0000-0001-6122-6175. Chien-Huan Chen, MD, PhD 0000-0003-1973-9991.

6. Please insert running (short) title.

Response: We have inserted short title for this manuscript as “Colonoscopy water jet malfunction mucosa injury”

7. Please write the manuscript according to the journal format requirements, including references.

Response: We had formatted the references according to the journal format requirements. We used Arabic numerals in the references section and in-text citations. Further included PMID and DOI numbers.

8. Please insert « Conflict-of-Interest Disclosure Form » and proper « Copyright License Agreement » (not as Supplementary Material).

Response: We have added these 2 documents as part of manuscript file.

Reviewer: 5

1. First, where did the rubber piece come from? (If you have a photo, it would be appreciated if you could show it.)

Response: The malfunctioned scope was sent to endoscopy maintenance facility outside of our institution for repair. Unfortunately, the technician at the facility did not take a photo of the piece of rubber, which was a component of the scope which broke off and lodged there. The technician did report that once the piece of rubber was removed, the water jet pressure normalized and the scope functions normally.

2. During the reprocessing of the colonoscope, what do you think is the reason why the rubber piece was not found while brushing?

Response: We appreciate the reviewer's comment. In fact, we discussed the same question with the endoscopy lab manager and maintenance technician to see if this could be detectable during reprocessing or if it is preventable. However, the piece of rubber was bent and lodged under the C-cover. Given its location, it would not be possible to see or find the piece of rubber during

inspection or brushing during reprocessing of the scope. We have clarified this further in the Discussion section.