

How to Improve Visualization During Laparoscopic Surgery in Jaundice Patients: The Yellow Balance

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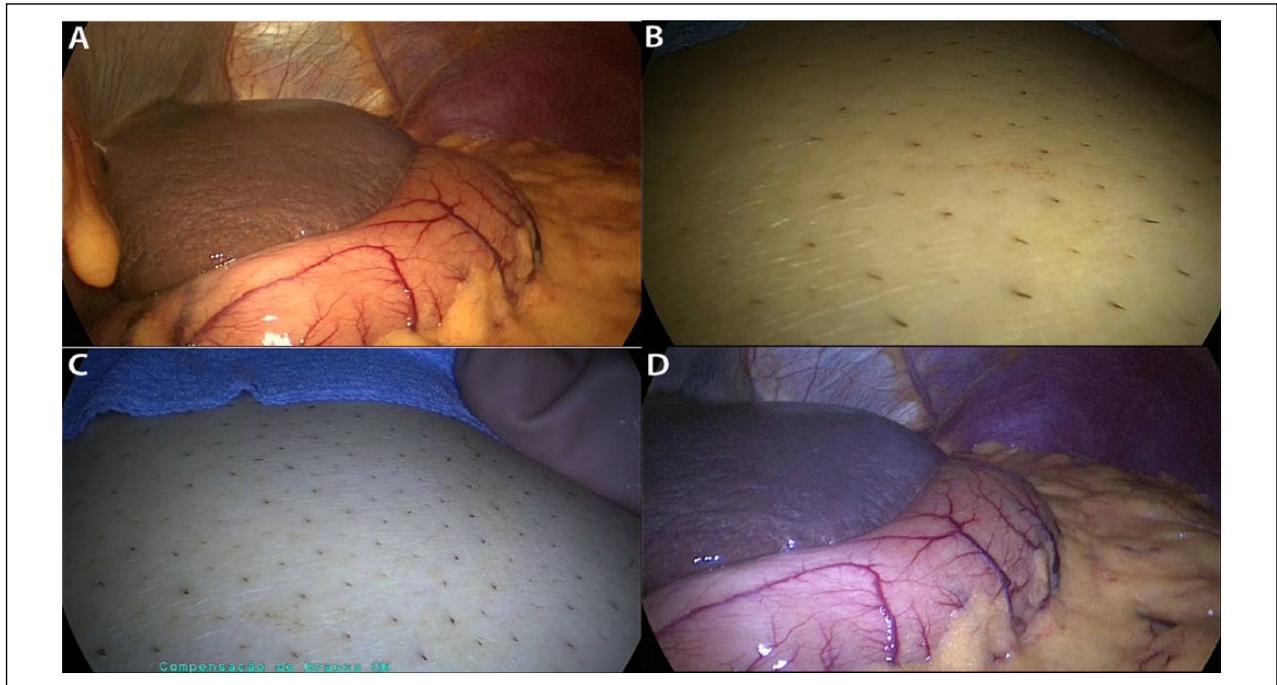


Figure 1. The yellow balance to improve visualization during laparoscopic surgery in jaundice patients. (A) Intraoperative view of the abdominal cavity in a jaundiced patient. (B) The jaundiced skin of the patient was used as a “white” reference for white balance adjustment. (C) Skin appearance after “yellow balance.” (D) Intraoperative view of the abdominal cavity in a jaundiced patient after “yellow balance.” Appearance returns to that expected in a nonjaundiced patient.

Dear Editor:

Recent technological advancements have led to the introduction of high-quality cameras in laparoscopic surgery. The better view achieved with this new equipment along with the use of a high-definition monitor improved the quality of vision resulting in better precision of surgical performance. The longer the surgical procedure the greater the need for better visualization. In patients with jaundice, the visualization of the surgical field may be impaired by the tainting of the tissues by the accumulation of bilirubin. The yellowish pigmentation of the tissue may make it difficult to identify the anatomical structures and its margins may appear blurred.

In order to overcome this problem, we have used a simple trick. At the beginning of the procedure we use the white

balance adjustment from the camera using a white pad as a reference. As we enter the abdominal cavity with the laparoscope we can see the abdominal cavity tainted by the yellow pigment from hyperbilirubinemia (Figure 1A). We then perform a “white” balance using a yellow pad to adjust the color of the video, the so-called “yellow balance.” Another way to do it is to use the patient’s skin (Figure 1B and C), if the patient is Caucasian. The appearance of the abdominal cavity returns to was to be expected in a nonjaundiced

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patient (Figure 1D; see also Supplementary Material, Video 1, available online at <http://sri.sagepub.com/content/by/supplemental-data>).

White balance is the process of removing unrealistic color casts, so that tissue that appears white in real are rendered white in the video. Our eyes are very good at judging what is white under different light sources, but if not done properly, digital video cameras can create unsightly blue, orange, or even green color casts. Usually this adjustment has to take into account the “color temperature” of the light source and it should be done without influence of any other light source in the operating room. White balance basically means color balance. It is a function that gives the camera a reference to “true white”—it tells the camera what the color white looks like, so the camera will record it correctly. Since white light is the sum of all other colors, the camera will then display all colors correctly. The “yellow balance” uses the same principle to remove the excess of the yellow color from the bile pigment. This adjustment can be done with several shades of yellow until we achieve a comfortable view.

This simple trick is routinely used in our laparoscopic surgical procedures such as pancreatoduodenectomy or

hepaticojejunostomy in jaundice patients. We recommend the use of this simple color adjustment to improve surgical visualization during these complex procedures.

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Acquisition of data: All authors
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Authors' Note

Any underlying research materials related to this article are available on request from the corresponding author.

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