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LETTER TO THE EDITOR

Use of the BHS robotic scope to perform lymphovenous anastomosis

In the microsurgical setting, the microscope covers a key role in terms of accuracy and safety of the procedure. Over the last few years, big steps forward have been made in order to help the work of the surgeon. However, most solutions available at the moment are inherently a compromise between efficacy and practicality. Nowadays the paradigm has shifted from getting higher levels of magnification to getting the best possible view of the surgical field under all circumstances. This means having a sufficient image perimetry as well as 3D vision, combined with the highest possible resolution. Last but not least, the ergonomics of instruments and microscope are becoming increasing important in the light of long and demanding microsurgical operations to ensure reliable and reproducible good outcomes.

In this context, we would like to share our initial experience with the newly developed Robotic Scope by BHS Technologies (Innsbruck, Austria) in a supermicrosurgical context. This revolutionary instrument combines a very high-resolution digital image with game changing ergonomics. Unlike the conventional microscopes, it consists in a head-mounted display (HMD) and a robotic camera head and mount (Figure 1(a)). With the HMD on the head, the surgeon has two digital microdisplays right in front of his eyes just like a pair of glasses (Figure 1(b)). The robotic camera is located above the surgical field

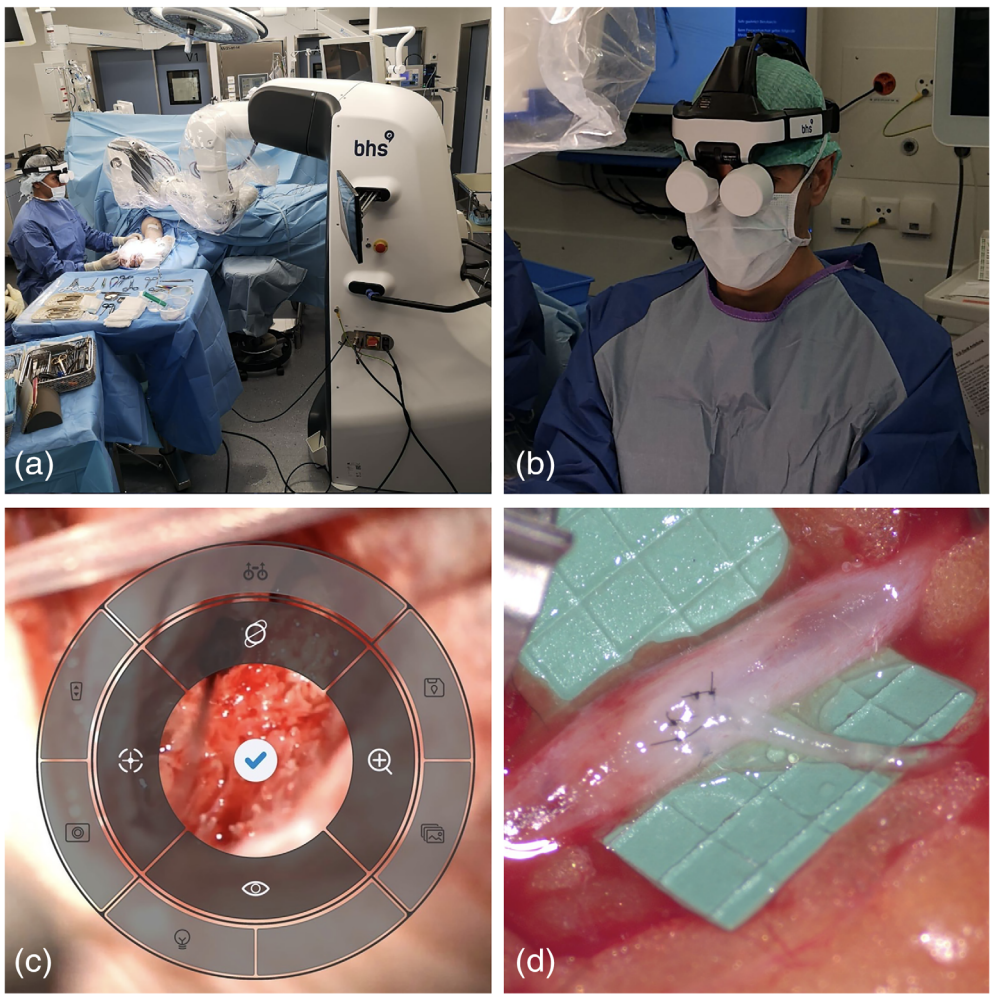

FIGURE 1 (a) The BHS robotic scope in the operating room setting. (b) The head-mounted display (HMD) on the head of the surgeon during the operation. (c) Setup menu interface. (d) Intraoperative picture of the lymphovenous anastomosis in end-to-side fashion

and captures high-resolution images; the camera head and mount movement are controlled by head movements of the surgeon detected by the HMD. Thus, the robotic scope mirrors the head movement of the surgeon in space, thus rendering the control of the scope totally hands free. All these features provide a much more ergonomic posture and intuitive scope control avoiding the surgeon being immobilized in the same position for any longer period of the time. All the functions and the scope menu and settings from zooming to turning the camera head are controlled by a foot clutch and the head movements of the surgeon (Figure 1(c)). The operating field remains always in view and no manual adjustments or change of hands are needed.

We performed multiple lymphovenous anastomosis in the arm of a 77-year-old women with breast cancer related lymphedema refractory to conservative treatment with compressive banding and lymph drainage (Figure 1(d)). During the procedure we reached a magnification up to ×34.4 with no decrease in image resolution.

Although further evidence is needed to confirm the efficacy of the robotic scope, it is perceivable that this new technology could be a significant advantage in the microsurgical and supermicrosurgical setting, allowing the surgeons to work in a more accurate, more flexible, faster and safer manner.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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