



## Case Study of the Month

# Simplifying Patient Positioning and Port Placement During Robotic-Assisted Laparoscopic Prostatectomy

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### Abstract

Proper patient positioning and port placement is of critical importance in robotic-assisted laparoscopic radical prostatectomy (RALP). Not having the patient in the correct Trendelenburg position or not being able to move the surgical instruments freely in the abdominal cavity can be frustrating, especially for *naïve* robotic surgeons (ie, those at the beginning of the learning curve for this procedure), and can lead to further difficulties in performing the intervention. We describe the use of a nautical inclinometer and a plastic, double-equilateral triangle with an 8-cm-long border to reach the correct Trendelenburg position easily and to place trocars correctly during RALP.

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## 1. Case report

Robotic-assisted laparoscopic radical prostatectomy (RALP) has been progressively gaining space in the clinical arena as an efficacious and safe treatment for clinically localised prostatic cancer [1–3]. The learning curve for RALP is steep [4] and involves all steps of the procedure, starting with patient positioning and placement of the trocars. We describe two details of the technique that are extremely helpful to us in the initial steps of the operation.

### 1.1. Patient positioning

The patient is positioned supinely, as for standard open prostatectomy. The legs are divaricated by 30° without using any kind of stirrups, which allows the positioning of the da Vinci system. It is known that an adequate

Trendelenburg position is of critical importance to perform RALP. We use a simple *nautical inclinometer* (Fig. 1) to identify the correct incline of the bed rapidly and precisely. With such a device, the surgeon may request the desired angle of incline right before docking the system. At our institution, we have had success using a 30–35° angle of incline.

### 1.2. Port placement

Pneumoperitoneum is induced using the Hasson technique at the level of the umbilicus, where the optical trocar is positioned. Once the abdomen is insufflated, the following landmarks are identified and marked with a dermatographic pen: (1) the upper margin of the pubis bone; (2) the antero-superior iliac spine, bilaterally; (3) the point on the midline at a distance of 15 cm from the pubis bone (Fig. 2).

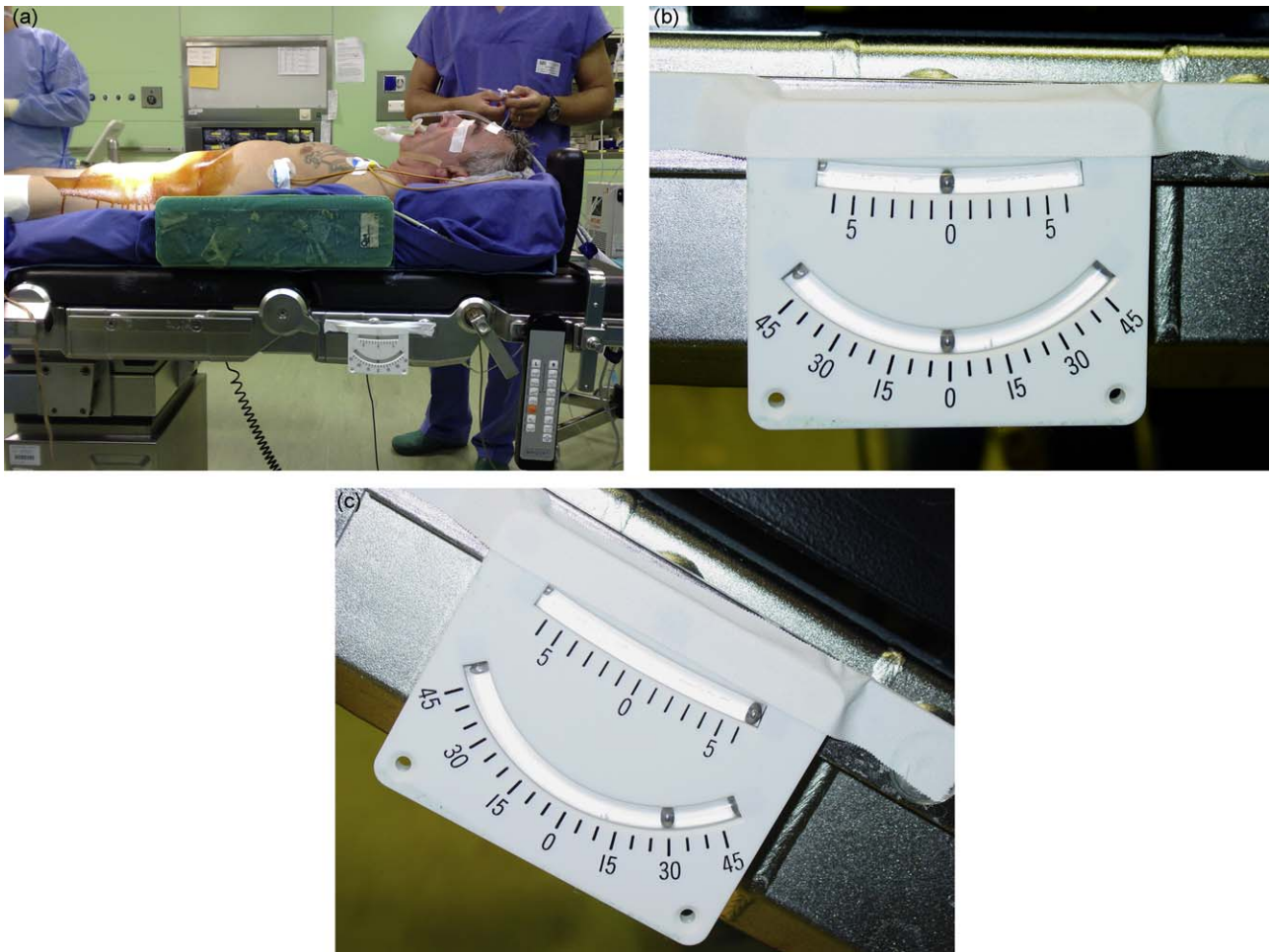


Fig. 1 – The nautical inclinometer (a) is permanently fixed on the surgical bed and (b,c) allows the surgeon to control with precision the degree of Trendelenburg position prior to docking the da Vinci robotic system to the patient.

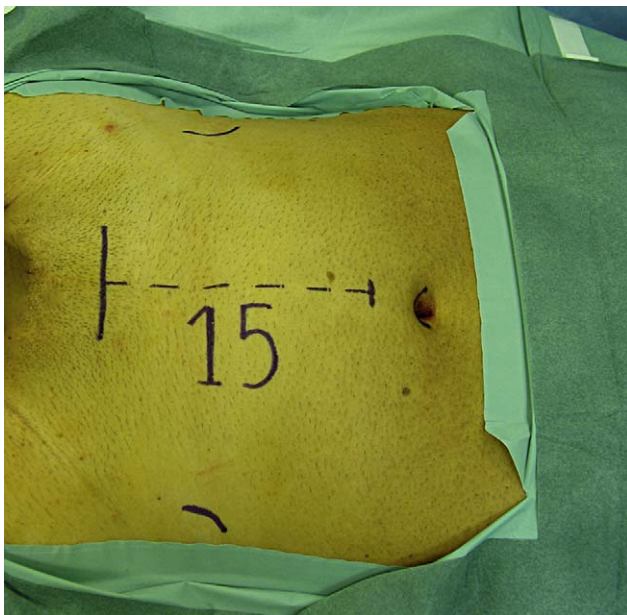


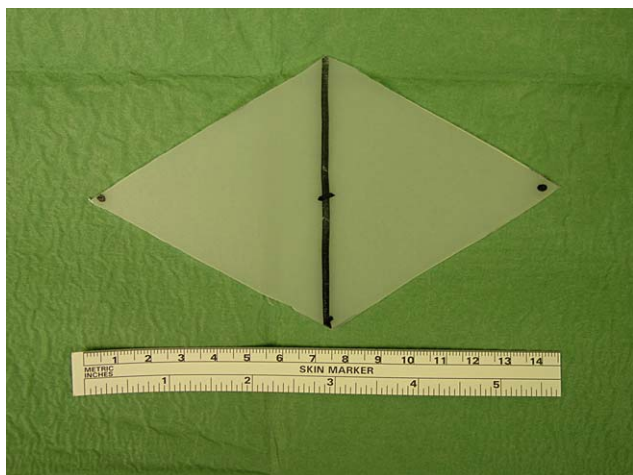
Fig. 2 – The anatomic landmarks to be identified prior to using the double-triangle technique for port placement are the pubis bone; the antero-superior iliac spine, bilaterally; and a point 15 cm cranially to the pubis bone on the midline.

A plastic, reusable, double-equilateral triangle with each border measuring 8 cm (Fig. 3) allows identification of the precise positions of the operative trocars (for the robotics and for the assistant) within a few seconds. The triangle is positioned with one acute corner on the abdomen at the level of the midline point and with the inferior border in line with the midpoint of the iliac crest (Fig. 4a). The other vertices of the figure point exactly to where the operative trocars should be positioned (Fig. 4b), first on the right side, and then on the left side (reverting the double-equilateral triangle). The final aspect is shown in Fig. 5.

### 1.3. Demographics

These technical details were used in 30 consecutive patients who were allocated randomly to group A (15 patients: nautical inclinometer plus the *double-triangle* technique) or to group B (15 patients: incline of the table and trocar placement obtained following the surgeon's opinion). We calculated the time needed to start the operation and the

**Note:** To facilitate the reader's understanding, the abdominal landmarks have been identified prior to induction of the pneumoperitoneum. During the procedure, these landmarks are identified after induction of the pneumoperitoneum.



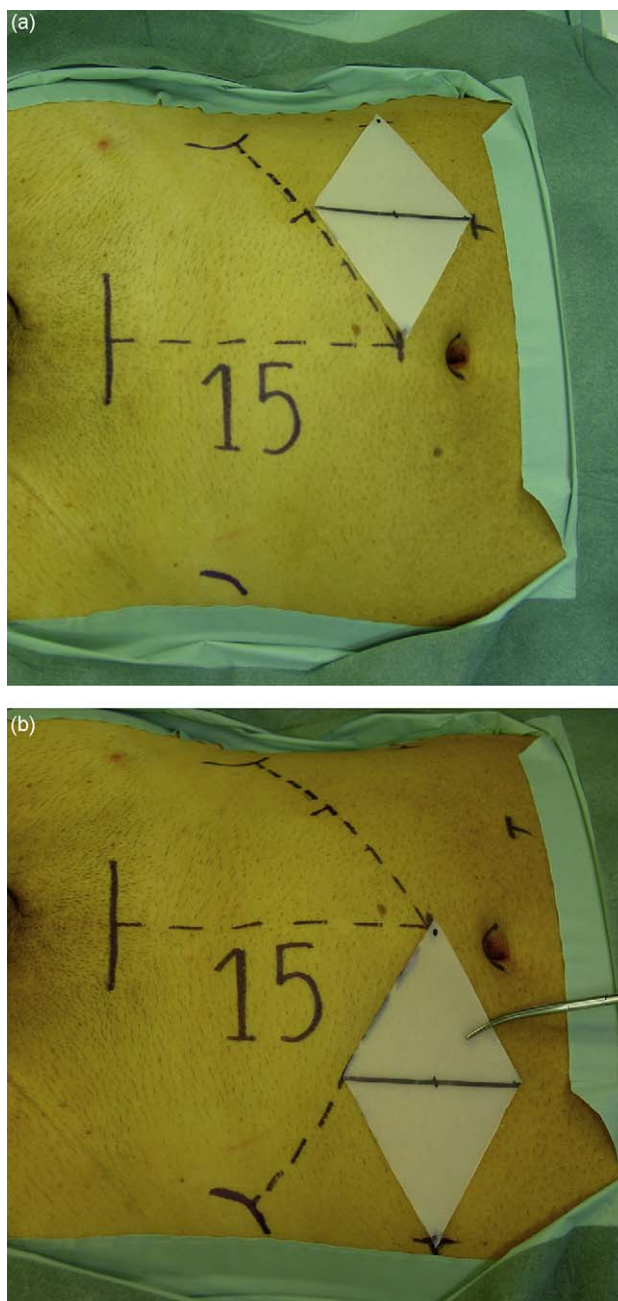
**Fig. 3 – The homemade, plastic, double-equilateral triangle. Each border measures 8 cm. The two acute angles measure 60°, and the two wide angles measure 120°.**

incidence of the *chasing swords* phenomenon. There were no differences between groups in baseline parameters. Time needed to start the surgical procedure (from completion of anaesthesia to start of the procedure at the console) was significantly shorter for group A ( $17 \pm 2$  minutes vs  $24 \pm 4$  minutes;  $p < 0.05$ ). Port placement was always correct in group A, with no chasing swords; two patients in group B needed repositioning of one or two trocars.

## 2. Discussion

A *naïve* robotic surgeon, one without prior experience in laparoscopy, may encounter significant problems during positioning of the patient and placement of the ports. We showed two details of the technique that, in our experience, have proven to be very efficient.

It can be frustrating if the patient is not in the correct degree of Trendelenburg position to properly mobilise the bowel by gravity or if the surgeon cannot move the surgical instruments freely in the abdominal cavity (ie, the chasing swords phenomenon) or cannot reach particular regions in the surgical field. These problems can be especially frustrating at the beginning of the learning curve for this innovative surgical procedure and can lead to further difficulties in performing the operation. Moreover, once the da Vinci system is docked to the patient, neither the robotic system nor the patient position can be modified unless the entire system is undocked and subsequently redocked following modification, with important loss of time. Finally, anaesthesiologists do not like prolonged Trendelenburg position during laparoscopic procedures. Often it is difficult for the surgeons and the anaesthesiologist to reach agreement about the degree of Trendelenburg position. In our experience, positioning the optical trocar at the level of the umbilicus, at 30–35° of Trendelenburg, is adequate for RALP in all patients. The use of the nautical inclinometer allows for easy, fast, precise, objective, and reproducible control of the degree of

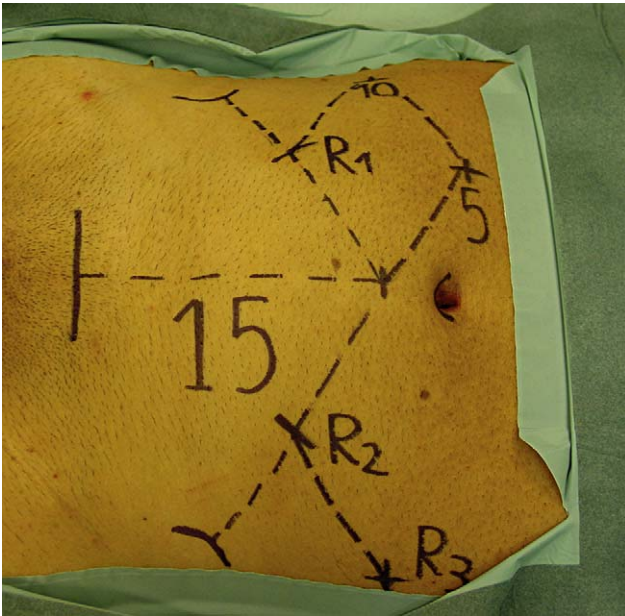


**Fig. 4 – The double-equilateral triangle is positioned on the abdominal cavity to properly identify port placement (a) on the right side and (b) on the left side of the patient.**

**Note:** To facilitate the reader's understanding, the abdominal landmarks have been identified prior to induction of the pneumoperitoneum. During the procedure, these landmarks are identified after induction of the pneumoperitoneum.

Trendelenburg position prior to docking the robotic arms to the patient.

Both robotic and assistant trocars must be positioned about 8 cm from the others to have the adequate degree of freedom between the instruments. Several port positions have been reported for RALP [5–7], with the optical trocar at the level of or just above the umbilicus. A significant amount of time may be required to find the right locations



**Fig. 5 – The final aspect of the port positions for robotic-assisted laparoscopic radical prostatectomy at our institution, using the double-triangle technique.**

**Note:** To facilitate the reader's understanding, the abdominal landmarks have been identified prior to induction of the pneumoperitoneum. During the procedure, these landmarks are identified after induction of the pneumoperitoneum.

on the abdomen where the ports should be placed. We prefer to place the optical trocar at the level of the umbilicus because it is closer to the abdominal cavity and, in our experience, provides adequate visualisation of the surgical field, both in laparoscopic and robotic prostatectomy. Moreover, the extraction of the surgical specimen through the umbilical incision allows for a better cosmetic result.

With the double-triangle technique described above, it is possible to correctly position the operative ports with the correct distance in all cases. We routinely use this technique and have used it with RALP patients ranging in height between 1.58 and 2.1 m and ranging in body mass index between 21 and 38. Moreover, this port placement technique proved to be very easy to teach to residents, who described the method as fast, easy, and very user friendly. Our proposal is particularly helpful when teaching junior residents the preliminary steps of RALP.

**Conflicts of interest:** The authors have nothing to disclose.

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Question:

Why are correct patient and port placement of pivotal importance in robotic-assisted radical prostatectomy?

- A. They permit adequate movement of robotic arms and assistance to avoiding the *chasing swords* phenomenon.
- B. In cases of incorrect port placement, it is necessary to reposition one port or more and to redock the robotic arms, which causes a subsequent increase in operative time.
- C. All of the answers are correct.
- D. Only answer B is correct.

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