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Budget Impact Analysis of Minimally Invasive Techniques Against Abdominal Hysterectomy for Benign Gynaecological Conditions: A Spanish Hospital Perspective

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Objective

A hysterectomy is the surgical removal of the uterus, and most likely, the cervix, with four possible surgical approaches for benign disease: abdominal (AH), laparoscopic (LH), vaginal (VH), and robotic-assisted hysterectomy (not assessed).

This analysis aims to estimate the budget impact of increasing minimally invasive surgical approaches to hysterectomy for women with benign gynaecological conditions [LH and VH with/without bipolar vessel sealing (BVS) as a haemostatic control method] against AH from a Spanish, tertiary hospital perspective.

Methods

- A cost analysis was developed based on previously published data assessing different surgical approaches for benign hysterectomy and endorsed by a clinical expert.[1]
- Unit costs, obtained from different Spanish sources and expressed in €2022, were applied to health resource consumption comprising the preoperative hospitalization, the surgical procedure, the postoperative hospitalization and complications related to surgical approach up to 1 year (Table 1).
- The operating time, postoperative hospitalization, and complication rates in the VH-BVS arm were calculated as per the reductions observed in a previously published trial comparing VH-BVS against conventional VH (61%, 23% and 25%, respectively).[2]
- The base case, considering the hospital's surgical case-mix (20.0% AH, 50.0% LH and 30.0% VH), was compared with a desirable scenario with higher rates of minimally invasive procedures (10.0% AH, 52.5% LH and 37.5% VH with BVS).
- An alternative analysis, comparing the current surgical case-mix in the Spanish setting (42.0% AH, 28.0% LH and 30.0% VH)[3] with a desirable scenario (20.0% AH, 35.0% LH and 45.0% VH with BVS) was also carried out.
- Deterministic sensitivity analyses were performed to assess the robustness of the base case results. Unit costs were varied by ± 20%.

Results

- Mean total costs per patient undergoing AH, LH, VH and VH-BVS were estimated at €4,902.0, €4,300.7, €3,086.7, and €2,203.1, respectively (Figure 1).
- Comparing current against desirable hospital's surgical case-mix scenarios resulted in mean total cost savings of €482.5 per patient. Costs associated with the preoperative hospitalization, surgical procedure, postoperative hospitalization and complications decreased €3.6 (17.0%), €186.7 (11.4%), €187.9 (12.1%) and €104.4 (12.4%), respectively (Figure 2).
- The alternative analysis showed that comparing current against desirable surgical case-mix scenarios in Spain would result in mean total cost savings of €712.0 per patient (Figure 3).
- Results from univariate sensitivity analyses are shown in Figure 4. Overall mean costs of the hospital's scenarios comparison were more sensitive to changes in the operating room unit cost.

Table 1: Health resources and unit costs considered in the analysis.

Health resource	AH	LH	VH	Unit cost (€ 2022)
Preoperative hospitalization (days)	0.05[a]	0.03[a]	-	€ 839.8[4]
Surgical procedure				
General anaesthesia	1[a]	1[a]	0.3[a]	€121.4[5]
Neuraxial anaesthesia	-	-	0.7[a]	€4.7[5]
Operating room (hours)	1.6[1]	2.1[1]	1.3[1]	€761.4[6]
Surgeon	3[a]	3[a]	2[a]	€24.0[7]
Anaesthesiologist	1[a]	1[a]	1[a]	€24.0[7]
Nurse	2[a]	2[a]	2[a]	€13.9[7]
Nurse assistant	1[a]	1[a]	1[a]	€9.8[7]
Postoperative hospitalization				
Recovery room (hours)	1.3[a]	1.3[a]	1.0[a]	€67.3[4]
Ward stay (days)	2.5[1]	1.6[1]	1.5[1]	€839.8[4]
Complications (%)				
Haemorrhage	13.4[1]	7.6[1]	5.1[1]	€2,653.9[3]
Bowel injury	2.8[1]	1.9[1]	1.7[1]	€19,564.2[3]
Urinary bladder injury	2.5[1]	2.7[1]	2.5[1]	€5,342.8[3]
Ureteric injury	0.5[1]	0.8[1]	0.3[1]	€5,342.8[3]
Vessel injury	0.6[1]	0.5[1]	0.6[1]	€2,653.9[3]
Nerve injury/impairment	0.2[1]	0.2[1]	0.2[1]	€4,892.5[3]
Fascia/wound rupture	0.6[1]	0.3[1]	0.1[1]	€5,135.5[3]
Fistula	0.4[1]	0.1[1]	0.1[1]	€5,602.0[3]
Conversion to AH (%)	-	10[1]	0.5[a]	-

[a] Expert input

Figure 1: Total cost associated with each surgical approach to hysterectomy.

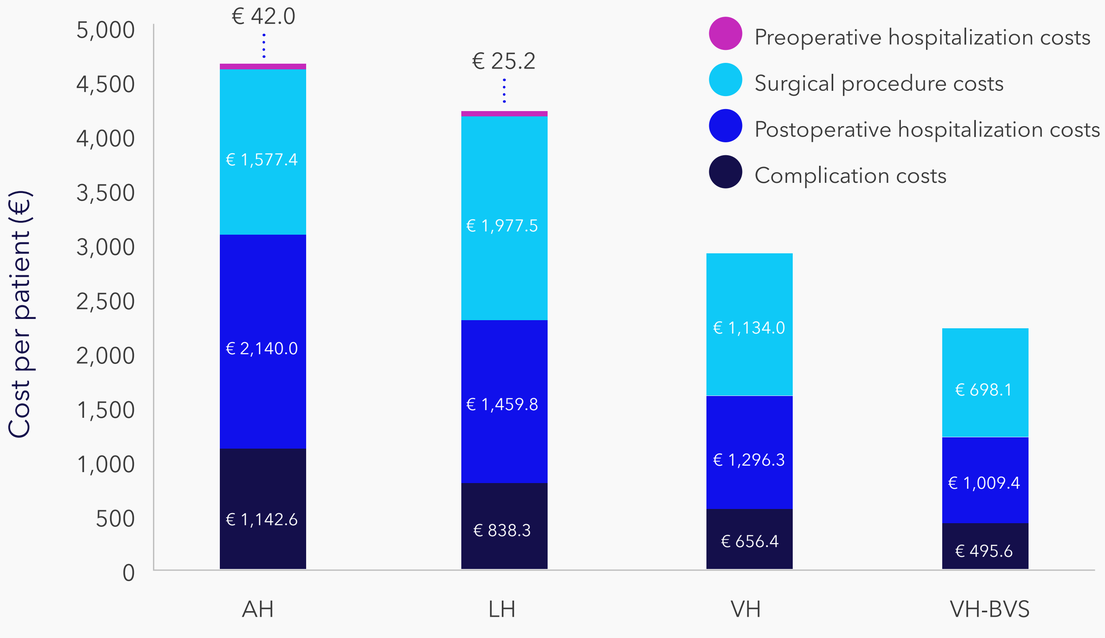


Figure 2: Preoperative hospitalization, surgical procedure, postoperative hospitalization and complication costs in current against desirable hospital's surgical case-mix scenarios.

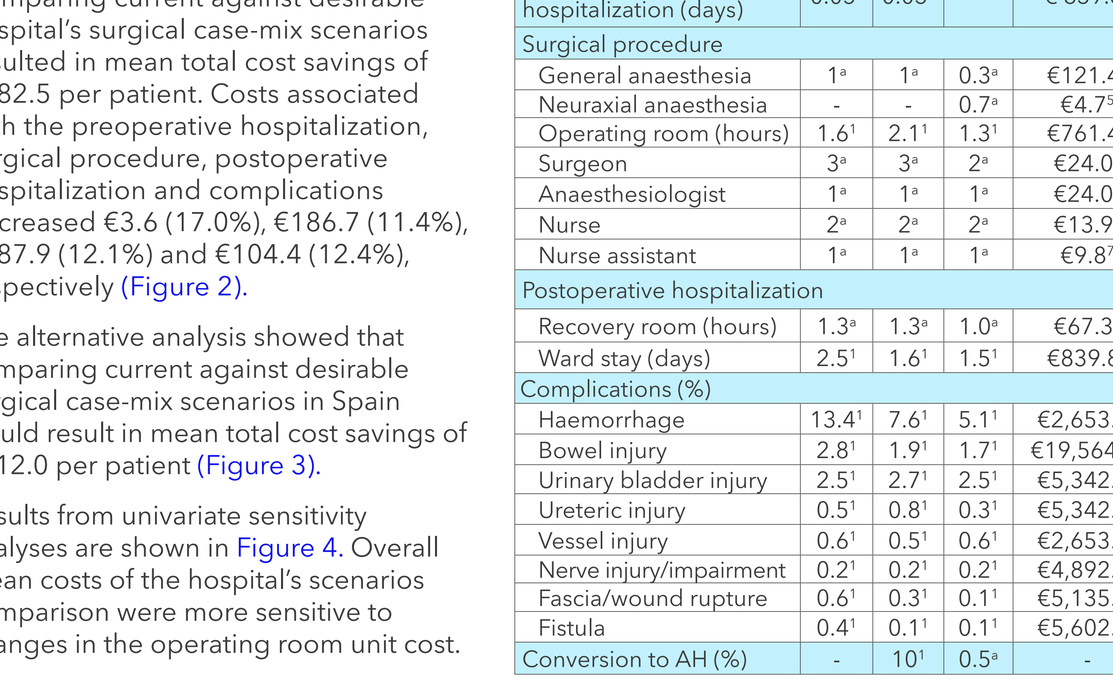


Figure 3: Preoperative hospitalization, surgical procedure, postoperative hospitalization and complication costs in current against desirable surgical case-mix scenarios in Spain.

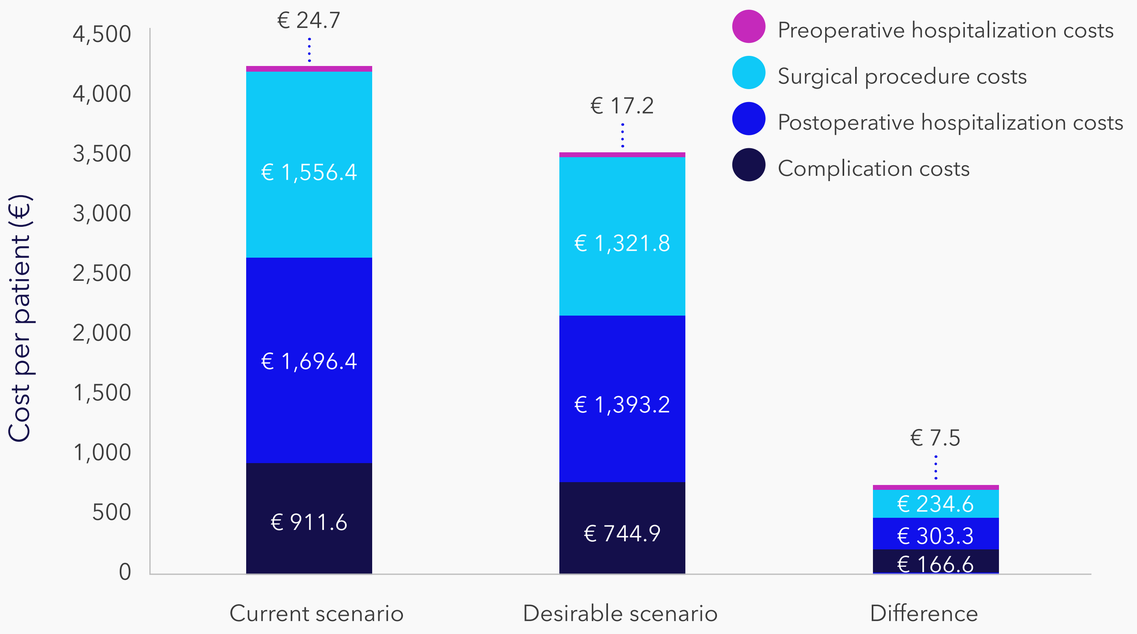
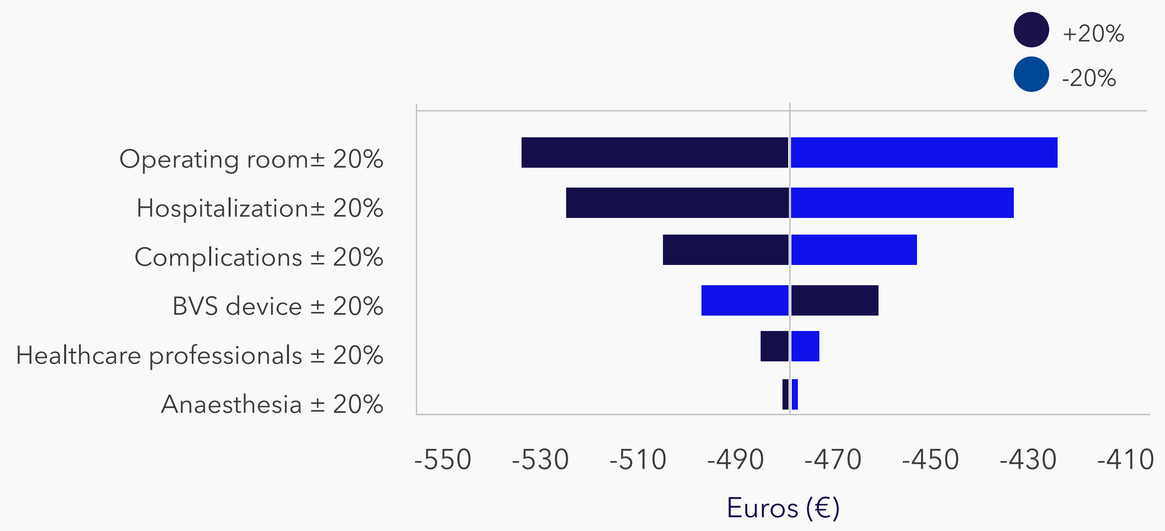


Figure 4: Tornado diagram of univariate sensitivity analyses.



Conclusion

Efforts to increase minimally invasive techniques to improve the care of women with benign gynaecological conditions could yield relevant savings in Spain.

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