

Introduction

- Hysterectomy is one of the commonly performed major surgical procedures. Indications for hysterectomy ranged from benign conditions such as uterine fibroids, to gynecological cancers.[1]
- Approaches to perform hysterectomy include abdominal (AH), vaginal, laparoscopic (LH) and robotic-assisted (RAH).
- Several economic evaluations were published on RAH but reported inconsistent results.
- This systematic literature review examined the reported cost-effectiveness and budget impact of RAH versus other surgical approaches.

Methods

- A systematic search was conducted to retrieve literature from January 1, 2010 to October 26, 2020 (search date).
- Data sources: Pubmed, Embase, Scopus, International HTA database, and the Centre for Reviews and Dissemination database.
- An additional targeted grey literature search was conducted to identify Health Technology Assessment (HTA) reports.

Eligibility Criteria

- Eligible study types are cost-effectiveness analysis (CEA), cost-utility analysis (CUA), cost-minimization analysis (CMA), and budget impact analysis (BIA) containing da Vinci-assisted robotic surgery used in hysterectomy. Studies containing costing data only were excluded.
- Only primary studies were included. Published reviews were screened to capture potentially eligible primary studies.

Risk of Bias & Data synthesis

- Methodological quality was assessed using the Consensus on Health Economic Criteria (CHEC)-Extended checklist.
- A structured narrative synthesis was developed to summarize results of costs, health outcomes (e.g., quality-adjusted life-years [QALYs]), and cost-effectiveness outcomes (e.g., incremental cost-effectiveness ratios [ICERs]).

Results

- Fourteen published studies [2-15] and 4 HTA reports [16-19] met the eligibility criteria (see Appendix Figure 1 for PRISMA flow diagram). There were 6 CUA/CMA/CEAs and 13 BIAs, including 1 HTA which conducted both CMA and BIA. (Figure 1.)

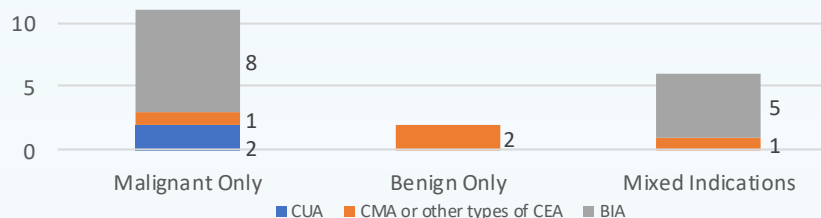


Figure 1. Number and types of analyses by gynecological populations.

- Endometrial cancer (EC) is the most examined indication (7/11 malignant only studies, see Appendix Figure 2).
- Majority of all publications had a time horizon of one year or shorter (13/19, 68%). (Figure 2.)
- Of the total publications, no study scored excellent methodological quality; 9/18 (50%) were of moderate quality, while 5/18 (28%) and 4/18 (22%) were of good and low quality, respectively.
- Directions of results were heterogeneous with regards to the cost-effectiveness and budget impact of adopting RAH. (Figure 3.)

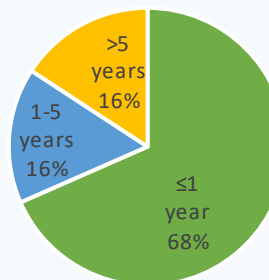


Figure 2. Proportion of publications by time horizon examined.

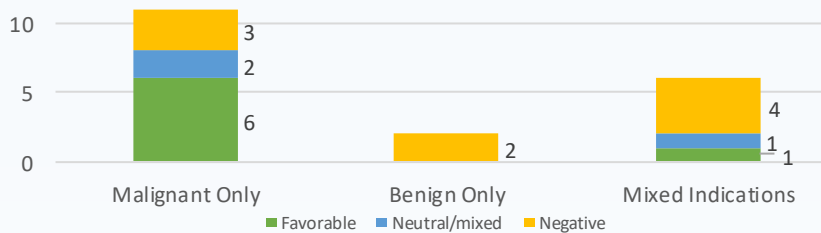


Figure 3. Number of publications and direction of results for RAH by gynecological populations. See Supplementary Materials for clarification on the terms favorable, neutral/mixed, and negative.

Results by Population

Malignant conditions:

- Cost-effectiveness:** For 2 CUAs compared to AH, RAH is more cost-effective under varied range of willingness to pay (\$8,041 USD/QALY in Thailand, SEK684K/QALY in Sweden) [3,10]. For 1 CUA and 1 CMA compared to LH [3,13], RAH was reported to be more costly with less to equal effectiveness than LH.
- Budget Impact:** 6 out of 8 BIAs showed cost savings when the uptake of RAH increased, ranging from \$397 per person in cost saving over 90 days to \$875K CAD in hospital budget saving over 15 years.[2,5-9,15,19]. Large cost savings were seen especially in morbidly obese population, where the cost per patient were lowered by \$8,752 after the adoption of RAH. The cost difference accounted for the amortized cost of the surgical system [8].

Benign conditions: There is no study assessing RAH with AH. Of the two eligible studies, RAH had higher incremental costs than LH [4,11].

Mixed indications: Studies varied in terms of population, time horizon, perspective, and types of cost included. A range of results were reported in the mixed indication population, from cost saving (e.g., €201K in 1 year for a hospital) to additional budget (CHF 4M in 1 year for public payer) [12,14,16-18].

Discussion and Conclusion

- High heterogeneity and varied study quality were observed for the cost-effectiveness and budget impact literature for RAH, which might explain the inconsistent results across populations and uncertainty in conclusions.
- Most of the existing publications had time horizons of 1 year or less. Given the heterogeneous results in the current review, future economic evaluation studies should select appropriate time horizons that capture the relevant outcomes and costs to different stakeholders.
- CUA was only conducted in the EC population. Future research on health utility and quality of life in other gynecological populations is needed.

Supplementary Material

Contains references and additional figures.

Contact Information

Email: Lucia.Cheng@intusurg.com
Address: Intuitive, 1020 Kifer Rd,
Sunnyvale, CA 94086, USA