International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Hugo™ RAS docking configurations in gynecologic robotic surgery: a scoping review protocol

INPLASY202650172
doi: 10.37766/inplasy2026.5.0172
Received: 30 May 2026
Published: 30 May 2026

Sen, S; Gulgel Sen, FG.

Corresponding author:
Serhat Sen

serhatsen8@gmail.com

Author Affiliation:
Istinye University Faculty of Medicine, Liv Hospital Topkapi Campus, Obstetrics and Gynecology, Istanbul, Türkiye.

ADMINISTRATIVE INFORMATION

Support - No external funding.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - The authors declare no competing interests. Neither author has received personal fees, equity, consulting income, travel grants, speaking honoraria, or institutional support from Medicaroid, Cambridge Medical Robotics (CMR Surgical), Intuitive Surgical, Asensus Surgical, or any other robotic surgery platform manufacturer. Neither author's affiliated institution (Liv Hospital Topkapi, Medical Park Gaziosmanpaşa) operates a Hugo™ RAS system at the time of protocol registration; the review is conducted as an external literature scoping characterization, not as an internal device evaluation. No author serves on advisory boards or speakers' bureaus for any included device family.

INPLASY registration number: INPLASY202650172

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 May 2026 and was last updated on 30 May 2026.

INTRODUCTION

Review question / Objective Primary review question: What is the published scope of Hugo™ RAS docking configurations, port placement geometries, and operative parameters reported in gynecologic robotic surgery, and how do reported configurations align with or diverge from the 2026 Delphi consensus on Hugo™RAS gynecologic docking?

PCC framing.

Population (P): Adult women aged 18 years or older undergoing gynecologic surgery for benign or oncologic indications using the Hugo™ RAS robot-assisted surgery platform. No restriction on parity, body mass index, comorbidity, or prior surgical history.

Concept (C): Docking configurations, modular arm placement geometries, port spacing, table tilt, and reported intraoperative parameters; concordance of each report with the 2026 Delphi consensus on Hugo™ RAS gynecologic docking, characterized using the Hugo Docking-Modified Reporting Score (HuDoc-MRS).

Context (C): Gynecologic clinical practice across benign and oncologic indications, any country, any healthcare setting (academic, public, private), English-language sources published from platform launch (2020) onward to 28 February 2026.

Secondary objectives:
1. Map the four named configurations (compact straight, butterfly straight, modified bridge, three-arm asymmetric) against the reported clinical indications.
2. Characterize concordance with the 2026 consensus using HuDoc-MRS with two independent reviewers and report inter-reviewer agreement (Cohen's weighted kappa).
3. Catalogue ongoing trials and registry studies to inform future evidence priorities.
4. Identify reporting gaps and methodological inconsistencies as registry priorities rather than effect-size verdicts; reporting is hypothesis-generating, not adjudicative.

Background Robot-assisted gynecologic surgery has expanded from single-platform dominance (da Vinci, Intuitive Surgical) to a multi-platform field over the past five years. The Hugo™ RAS system (Medtronic, Medicaroid) entered European and Asian markets in 2020 and has since been adopted across benign and oncologic gynecologic indications. Unlike the integrated cart design of the legacy platform, Hugo uses four independent modular arm carts, allowing variable docking geometries: arms can be positioned at different angles around the patient cart, with table tilt and port spacing adjusted per procedure. This flexibility has produced a heterogeneous reporting landscape, where individual centers describe their docking approach in terms that are difficult to compare across reports.

Three observations motivated this scoping review.

First, a 2026 Delphi consensus on Hugo™ RAS gynecologic docking identified four named configurations: compact straight, butterfly straight, modified bridge, and three-arm asymmetric. The consensus left open whether these names are used consistently in the wider literature and whether published reports align with consensus parameters.

Second, published case series describe operative parameters such as table tilt, arm angles, and port distances using inconsistent terminology, making cross-study comparison difficult. The same configuration label is sometimes applied to procedures with substantially different geometries.

Third, ongoing trials (recruiting or in early-phase enrollment) outnumber published reports, suggesting that the evidence base will shift substantially in the next 24 to 36 months. A scoping characterization performed at this inflection point can inform trial design and registry harmonization before the literature consolidates.

The Population covered is adult women undergoing gynecologic robotic surgery; the Concept is docking configuration, arm geometry, and concordance with the 2026 consensus; the Context is clinical gynecologic surgery in any country.

This scoping review is conducted as an external literature characterization. Neither author's institution operates a Hugo™ RAS system, removing any direct conflict between findings and local practice. The review follows PRISMA-ScR (Tricco et al., 2018) and JBI scoping review methodology (Peters et al., 2020).

Rationale Hugo™ RAS docking heterogeneity is a documented methodologic concern: the same configuration label, for example "modified bridge," is applied by different authors to procedures with different table tilt, arm placement, and port spacing parameters. A scoping review is the appropriate methodology for three reasons.

First, the available evidence is predominantly descriptive (case series, single-center experiences, prospective registries) rather than comparative. There are no head-to-head randomized trials of configuration choice, and the comparative cohorts that exist use heterogeneous outcome definitions. Pooled effect estimation is therefore neither feasible nor methodologically defensible.

Second, the field is too young for meaningful meta-analysis. The platform launched in 2020, and the bulk of the published literature accumulated between 2023 and 2026. Reporting standards are still consolidating, and meta-analytic synthesis at this stage would inherit and amplify the underlying reporting inconsistencies rather than resolve them.

Third, the primary need at this inflection point is to map the configuration landscape, identify reporting gaps, and catalogue ongoing trials so that future investigators can build on a shared inventory. This is the scoping function as defined by Arksey and O'Malley (2005), refined by Levac et al. (2010), and operationalized by Peters et al. (2020) for the JBI methodology. PRISMA-ScR (Tricco et al., 2018) provides the reporting framework.

We perform risk-of-bias appraisal for transparency, not as a fitness gate. Scoping methodology does not require risk-of-bias assessment because inclusion is not contingent on study quality; however, we report appraisal results so that

readers can weight individual sources when interpreting the configuration map. The appraisal uses tool-appropriate instruments (ROBINS-I for non-randomized studies, AMSTAR-2 for systematic reviews used as background, JBI critical appraisal for case series).

No quantitative pooling, meta-analysis, or meta-regression is planned. All findings are presented as hypothesis-generating observations: candidate configurations to be tested in prospective comparative trials, candidate parameters to be standardized in registries, candidate reporting items to be required by journals. The review's value lies in cartography, not adjudication.

METHODS

Strategy of data synthesis Databases searched (date range: 1 January 2020 to 28 February 2026):
- PubMed/MEDLINE
- Embase (Elsevier)
- Cochrane CENTRAL
- Scopus
- Web of Science Core Collection
- ClinicalTrials.gov
- WHO International Clinical Trials Registry Platform (ICTRP)
- Google Scholar (first 200 records, grey literature)

Core search string (adapted per database syntax):
("Hugo RAS" OR "Hugo robot" OR "Hugo-RAS" OR "Hugo robotic" OR "Medicaroid Hugo" OR "Hugo platform") AND ("gynecology" OR "gynaecology" OR "hysterectomy" OR "myomectomy" OR "sacrocolpopexy" OR "endometriosis" OR "ovarian" OR "cervical cancer" OR "endometrial cancer" OR "pelvic surgery")

The search strategy was peer-reviewed using the PRESS (Peer Review of Electronic Search Strategies) checklist before execution. Forward and backward citation chasing was performed via Citationchaser on all included sources.

Synthesis approach: narrative synthesis with visual evidence mapping. No quantitative pooling (meta-analysis) is performed, in line with scoping review definition. Concept matrix tables, a configuration heatmap, and an evidence pipeline diagram are presented for the in-depth subset (n=7 included sources). Findings are reported following PRISMA-ScR and structured as hypothesis-generating observations rather than adjudicative claims.

Eligibility criteria Types of participants (P):
- Adult women (≥18 years) undergoing gynecologic surgery (benign or oncologic indication).
- No restriction on parity, BMI, prior surgery, or comorbidity.

Concept (C):
- Use of Hugo™ RAS platform with at least one documented docking configuration or arm placement description.
- Reports may include single configurations or compare multiple configurations.

Context (C):
- Any country, any healthcare setting (academic, private, public).
- English-language sources only (rationale: feasibility for two-reviewer team; non-English sources flagged for future amendment).
- Publication date 1 January 2020 to 28 February 2026.

Inclusion criteria:
- Original empirical reports (RCT, prospective/retrospective cohort, case series ≥3 cases, prospective registries).
- Sources describing Hugo™ RAS docking with at least two of three PCC dimensions specified.
- Conference abstracts included only if full-text available.

Exclusion criteria:
- Single case reports (n=1 or n=2).
- Editorials, opinion pieces, narrative reviews (used for citation chasing only).
- Reports of non-gynecologic Hugo™ RAS use (urology, general surgery) flagged for separate review.
- Reports where docking configuration not described or described only as "standard" without parameters.

Source of evidence screening and selection Two independent reviewers (S.Ş., F.G.Ş.) performed all screening and selection stages.

Stage 1 — Title/Abstract screening:
- Records imported into Rayyan (rayyan.qcri.org).
- Each reviewer blinded to the other's decisions until completion.
- Cohen's weighted κ calculated and reported.

Stage 2 — Full-text assessment:
- Full-text retrieved for all records passing Stage 1.
- Eligibility decisions made independently using a structured checklist.
- Author correspondence sent for unclear or incomplete reports.

Conflict resolution:

- Disagreements at any stage resolved by discussion between the two reviewers.
- If consensus not reached, a third senior reviewer (uninvolved in primary screening) adjudicated.
- All adjudication decisions logged with reasoning in Supplement S5 (Reconciliation Log).

Inter-reviewer agreement:
- Cohen's weighted κ = 0.927 for HuDoc-MRS classification.
- Cohen's weighted κ = 0.808 for concordance categorization.

PRISMA-ScR flow diagram (Figure 1 of manuscript): identification (n=147), title/abstract screening (n=82 after duplicate removal), full-text assessment (n=14), included (n=7), excluded with reasons (n=7), ongoing/pending (n=25 = 18 awaiting full-text + 7 active registry studies).

Data management - Bibliographic records: Zotero (group library, version-controlled), exported to .ris for Rayyan import.
- Screening: Rayyan (cloud-based, dual-blinded).
- Extraction: Custom Excel matrix (Supplement S2), with one row per included source and columns matching the predefined data items.
- Risk of bias: Separate worksheet in the extraction matrix, with tool-specific (ROBINS-I, AMSTAR-2, JBI) sub-sheets.
- Version control: Manuscript and supplements maintained in a private GitHub repository; deidentified copies deposited on Open Science Framework (OSF) at the time of INPLASY registration.
- Data retention: All extracted data, screening decisions, and reconciliation logs retained for 10 years per institutional policy.
- Privacy: No patient-identifiable data extracted; only aggregate study-level variables.

Reporting results / Analysis of the evidence Reporting follows PRISMA-ScR (Tricco et al., 2018) with the following structured outputs:

(a) PRISMA-ScR flow diagram (Figure 1): identification → screening → eligibility → inclusion, with reasons for exclusion and ongoing/pending tally.
(b) Configuration matrix table (Table 2): four named configurations vs reported parameters (table tilt, arm angles, port spacing, indication mix).
(c) Concordance heatmap (Figure 3): visual mapping of each included source against the 2026 Delphi consensus, color-coded for full/partial/no concordance.
(d) HuDoc-MRS scoring grid (Figure 4): per-source classification with English labels (Full / Partial / No concordance).
(e) Four OR layouts visual (Figure 5): schematic of the four named configurations. Subpanel 5D shows the three-arm asymmetric variant.
(f) Evidence pipeline diagram (Figure 6): completed sources plus ongoing trials/registries, with NCT identifier, institution, principal investigator, and recruitment status.
(g) Narrative synthesis: 4-layer rationale per major configuration: (i) proposer's stated rationale, (ii) emphasized advantage, (iii) objective parameters, (iv) our reading against the broader configuration map.

No quantitative pooling (meta-analysis) is performed. All findings are presented as hypothesis-generating observations for future trial design and registry harmonization.

Presentation of the results Draft visual outputs (already generated in manuscript version 2.1.2):

Figures:
- Figure 1: PRISMA-ScR flow diagram (147 → 7 included; 25 pending).
- Figure 2: Discordance map showing configuration variation across included sources.
- Figure 3: Collision / concordance heatmap of included sources against Delphi consensus parameters.
- Figure 4: HuDoc-MRS classification grid with per-source scoring (Full / Partial / No).
- Figure 5: Four OR layouts schematic for the four named configurations (compact straight, butterfly straight, modified bridge, three-arm asymmetric); subpanel 5D shows three-arm asymmetric.
- Figure 6: Evidence pipeline with completed sources and ongoing trials (NCT / registry identifiers).

Tables:
- Table 1: PCC eligibility criteria.
- Table 2: Configuration matrix (four named configurations vs reported parameters).
- Table 3: Risk-of-bias appraisal summary (ROBINS-I, AMSTAR-2, JBI).
- Table 4: Reporting completeness checklist per included source.

Supplements:
- S1: Full search strategy per database.
- S2: Extraction matrix (Excel).
- S3: Risk-of-bias detailed scoring.
- S4: Reporting completeness checklist.
- S5: Reconciliation log (dual reviewer disagreements and resolutions).

Language restriction English only. Non-English sources (n≈6) flagged for a future amendment once a multilingual reviewer is added.

Country(ies) involved Turkey. Both reviewers are based in Istanbul: Istinye University Faculty of Medicine, Liv Hospital Topkapi, and Medical Park Gaziosmanpaşa.

Other relevant information This scoping review is conducted as an external literature characterization. Neither author's institution operates a Hugo™ RAS system at the time of protocol registration, removing any direct conflict between the review's findings and local practice.

The protocol was developed iteratively across structured internal review phases, culminating in a rationale-layer analysis that characterizes each configuration along four dimensions: (i) proposer's stated rationale, (ii) emphasized advantage, (iii) objective reported parameters, (iv) our interpretive reading against the broader configuration map. Manuscript version 2.1.2 (May 2026) is the final pre-submission draft.

Submission to the Journal of Robotic Surgery (Springer Nature) is planned within four weeks of INPLASY DOI assignment, with BMJ Open and JMIG as backup targets. A companion Open Science Framework (OSF) project will host the full data package (search strategy, extraction matrix, reconciliation log, manuscript, figures) for transparency and replication.

Keywords Hugo RAS; robot-assisted surgery; gynecologic surgery; docking configuration; scoping review; PRISMA-ScR; JBI methodology; surgical platform comparison.

Dissemination plans 1. Peer-reviewed publication in the Journal of Robotic Surgery (Springer Nature) as primary target, with BMJ Open and the Journal of Minimally Invasive Gynecology (JMIG) as backup targets if not accepted.

2. Deposition of the full data package (manuscript, supplements, search strategy, extraction matrix, reconciliation log, figures) on the Open Science Framework (OSF) with a public DOI at the time of INPLASY DOI assignment, to support transparency and replication.

3. Conference presentation at the European Society for Gynaecological Endoscopy (ESGE) annual congress and the Society of Laparoendoscopic Surgeons (SLS) annual meeting; abstract submission to the European Society of Gynaecological Oncology (ESGO) is also planned.

4. Lay-language summary distributed via the corresponding author's professional website and institutional press office, with a Turkish-language version prepared for the national audience.

5. Author social media (Twitter/X, LinkedIn) sharing of the pre-print and final publication, including infographic figures suitable for clinician audiences.

6. Direct correspondence with the 2026 Delphi consensus authors to share findings and explore opportunities for collaborative refinement of the Hugo Docking-Modified Reporting Score (HuDoc-MRS) and related reporting standards.

Contributions of each author

Author 1 - Serhat Sen - Conceptualization, protocol design, search strategy, dual screening, dual extraction, risk-of-bias appraisal, narrative synthesis, manuscript drafting, figure design, and corresponding author/guarantor responsibilities. Author 1 led all phases and approved the final manuscript.

Email: serhatsen8@gmail.com

Author 2 - Feyza Gulgel Sen - Dual screening (reviewer 2), dual extraction (reviewer 2), risk-of-bias appraisal, reconciliation log curation, methodological review, manuscript revision. Author 2 read, provided feedback, and approved the final manuscript.

Email: feyzaa.gulgell@hotmail.com