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Review Article

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Endometriosis Management According to The Role of General Surgery in Comprehensive Surgical Care

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Abstract: Background Multidisciplinary surgical care of endometriosis No adequate evidence exists on the multidisciplinary management of deep infiltrating endometriosis (DIE) with general surgery, even though the prevalence of the disease is significant (bowel 30%, ureter 13%/found The results of this study are assessed among 125 Iraqi patients receiving a broad-based treatment of general surgery, gynecology, urology, and colorectal surgery and Prospective/retrospective at a tertiary Center of Inclusion: history of known endometriosis and general surgery (bowel 38, ureteral 16, bladder 11, diaphragm 13) in which Results were assessed with VAS pain, EHP-30, EQ-5D, Clavien-Dindo morbidity. Further complication predictors were discovered by logistic regression multivariate (AUC 0.85), depending on results, Age 34.5±7.4 years; rASRM stage 3.2±0.9. Primary findings: VAS pelvic pain: 3.9 +2.1 (7.6- 3.7, p=0.0001), EHP-30 total: 24 +-12 (52-28, p=0.001), EQ- 5D: 3.919 +-0.14 (p=0.005). 145±55 min of operative time, 3.2±1.8 days of LOS, 15.2 2 (bowel leak 3.2). Logistic regression: BMI:25 OR 1.8[1.2-2.7], bowel involvement OR 2.2[1.4-3.5], pre-op VAS OR 1.5[1.1-2.1] (all p<0.01) and discovered Bowel DIE subgroup was more pain relief (-4.2 vs. multi-site -3.5, p=0.03) hence concluded Intensive experience in general surgery use in endometriosis treatment is related to significant symptom and quality of life.

Keywords: Quality Of Life, Endometriosis, Management, General Surgery, Comprehensive, Surgical, Care.

INTRODUCTION

Endometriosis is a chronic, non-homogeneous gynecologic disease, which is defined by the occurrence of endometrial-like tissue in non-uterine areas, most commonly the peritoneum of the pelvis, ovaries, and the uterosacral ligaments. It is said to occur between six to ten percent in women of reproductive age with more women who experience pelvic pain, infertility, or have undergone pelvic surgery (Society of Pelvic Surgeons. 2024) The clinical diagnosis is wide-ranged, involving cyclical and noncyclic pain in the pelvis, dysmenorrhea, dyspareunia, and chronic pelvic discomfort, as well as infertility problems in patients and in severe cases, the presence of large gynecotic endometriomas in ovaries and obstruction of ureters. Being a complex disease, endometriosis requires a multidisciplinary approach that is patient-centred and includes medical treatment, reproductive planning, and, in case of necessity, surgery. In the given construct, general surgery, which has long been perceived through the prism of abdominal and oncologic operations, is an increasingly specialised part of overall surgical management of endometriosis (Nezhat C, *et al.*, 1992; Carter JE. 1994; Nezhat C, 2024)

The argument to use a surgical approach to the treatment of endometriosis is based on a few major points. One, the disease may often be widespread and the indications of endometriosis may not be restricted to gynecologic manifestations; the disease may spread to the peritoneum and the bladder, ureter, bowel, and, less frequent are the cases, to the small intestine, appendix, or colon (Nezhat C, *et al.*, 2012; Sourial S, *et al.*, 2014;). Operative practices and operative planning require general surgical skills of laparoendoscopy, colorectal anastomosis, and minimally invasive strategies that cause a minimum of tissue trauma and maintain functioning in the bowel or intestines and surrounding bowel. Second, despite the cases when surgical excision is limited to the pelvic structures, complex management is usually necessary when it comes to the extrapelvic compartments as well as to the co-occurring pathologies, such as adhesions, endometriomas, and the non-endometriotic lesions, that fall within the general surgical practice. Third, there is a growing amount of research to support the claim that well-considered, multidisciplinary surgical management can enhance symptom relief, recurrence, and quality of life, and this is

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especially true of those patients with complex/ deep-infiltrating endometriosis or disease that involves bowel and urinary tract functioning (Veeraswamy A, 2010; Sampson JA. 1927). A careful preoperative evaluation ought to incorporate gynecologic history, results of pelvic examination, and imaging (transvaginal ultrasound, MRI with specifically designed protocols to detect endometriosis, and, when necessary, CT urography), as well as multidisciplinary feedback of the gynecology, radiology, urology, and colorectal surgery the input of the general surgeon is the operative strategies that are associated with the most effective disease clearance and the lowest morbidity, the mastery of complex fistula repair, bowel resection, stricturoplasty, mesh-/organ-sparing approach, and meticulous anastomotic technique (Signorile PG, 2022; Teague EMCO, 2009). In bowel-involved endometriosis, deep-seated disease can penetrate into the rectovaginal septum, the sigmoid, or the ileocecal junction. General surgeons are involved in radical but conservative resections, and occasionally, may require segmental bowel excision with primary anastomosis, discoid excision of the seromuscular layer or seromuscular dissection to separate endometriotic implants off the bowel wall without injury to the lumen or continence where The team is working with colorectal specialists to ensure that technically complicated resections is carried out taking into consideration mesenteric vascular supply, pelvic floor, and postoperative bowel functionality. (Yovich JL, 2020; Nezhat FR, 2013; Nezhat C, 2013) In addition to bowel involvement, the endometriosis surgical pathway often overlaps with the problems of the urinary tract. Endometriosis of the ureters may also occur without initial detection, so it is important that ureterolysis, ureteral implantation, or partial ureteral excision is done accurately in case of selected cases. The general surgeons who have received training in the anatomy of the pelvis and retroperitoneal areas are important in the determination, dissection, and preservation of the ureters during the exploratory and definitive operations (Sobstyl A, 2023). These actions are beneficial to minimize the risk of iatrogenic injury and save renal functionality, which is the primary priority of patients who might already have chronic pain or infertility issues (De Cicco C, 2010).

The general surgery role is also relevant in the treatment of adnexal pathology linked with endometriosis, especially ovarian endometriomas. Although a cystectomy or cyst aspiration is typically done by gynecologists, complex or recurring endometriomas with dense adhesions can be better treated using a coordinated approach which takes into account oophorectomy, cystectomy techniques with minimum loss of ovarian reserve, and integration with fertility preservation strategies where needed. General surgical practice can enhance the safety and efficiency of adhesiolysis within the pericadia of major vascular origin and in the perivisceral insolubility, which can lead to the reduction of operative time and to the minimization of postoperative inflammatory effects that may simulate postoperative infections or cause adhesions (Riiskjær M, *et al.,* 2016).

Perioperative issues are one of the foundations of effective surgical management in endometriosis (Ballester M, 2011). Enhanced recovery after surgery (ERAS) measures, which include optimised analgesia, multimodal analgesia, early mobilisation, use of nasogastric tubes where necessary, and early oral feeding, can be used to reduce hospital stay and avert recovery (Dubernard G, 2008). The team should cover the issue of pelvic floor dysfunction, bladder and bowel management, sexual health, and it should be noted that endometriosis is not only a gynecologic disease but a systemic and psychosocial disease as well as Technically, the general surgeon has the ability to apply a skill set to endometriosis such as the skills in laparoscopy and robotic-assisted surgery, the skill of mastering haemostasis, the skill of precise dissection in the presacral space, and the responsibility to avoid the hypogastric plexus and the pelvic autonomic nerves. The laparoscopic, robotic, or hybrid open-laparoscopic approach is determined by the distribution of disease in the patient, the experience of the surgeon, as well as the patient like age of previous surgeries and body habitus. Notably, the surgical plan must be adaptable and willing to change to open operations in case of exposure loss or unexpected complications. The focus in each mode is to have maximum safe resection whilst maintaining the function of the pelvic organs and reducing the morbidity. There is a growing amount of evidence that shows that an integration of general surgical expertise into multidisciplinary endometriosis clinics is a viable undertaking. The advantages of these environments include the use of simplified diagnostic processes, automated interpretation of images, and integrated

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preoperative planning that integrates the work of gynecology, urology, colorectal surgery, radiology, and pathology.

MATERIAL AND METHOD

It is a retrospective/prospective cohort study based on a tertiary multidisciplinary co-morbid endometriosis center that combines general surgery, gynecology, urology, and colorectal surgery. The research assesses the results of 125 patients from Iraq with endometriosis undergoing surgical management (including general surgical procedures: bowel resection/discoid excision, ureterolysis/reimplantation, bladder resection, diaphragmatic stripping, adnexal procedures) as part of an overarching pathway of care between 2024 and 2025. The institutional review board gave ethical permission, and informed consent was gathered on potential data elements. The electronic medical records, anesthesia records, pathology reports, and patient-reported outcome measures (PROMs: VAS, EHP-30, EQ-5D) were used to extract the data.

Inclusion criteria: Women or individuals assigned female at birth, aged 18-55, with laparoscopically or radiographically confirmed endometriosis who have undergone surgery that includes elements of general surgery between 2024-2025 (n=125; mean age 34.5±7.4 years, BMI 26.3±4.8 kg/m 2).

Techs and Surgery. This is a procedure where the dentist removes the decayed teeth and substitutes them with an artificial tooth or implant that resembles a natural one.<|human|>Surgical Techniques and Perioperative Management. This is a procedure in which the dentist cuts away the decayed teeth and replaces them with a man-made tooth or implant that looks like a natural tooth.

General surgery elements Bowel dissection (segmental colectomy n=25, discoid excision n=13), development of mesenteric/rectovaginal plane, presacral neurectomy; Ureteral (ureterolysis n=12, reimplantation n=4); Bladder/diaphragm (partial cystectomy n=11, stripping n=13); Adnexal (oophorectomy n=18, cystectomy n=22 with anti-Mullerian hormone **Intraoperative adjuncts Nerve-sparing, ICG perfusion, ureteral stents (78-percent ureteral cases), primary anastomosis (stapled 85-percent). **Conversion criteria: Hemorrhage over 500 mL, adhesions to cloud planes, or ventilatory failure (diaphragm).

Outcome Measures

Primary outcomes: Symptom relief (AVIS pelvic pain -3.9±2.1, dyspareunia -4.1±2.3, non-cyclic pain -3.6±1.9; all p<0.001 paired t-test); QoL (AVIS total -2412: -3315; AVIS -2412: +0.1914; paired t-test p<0.005); 30-day morbidity (Clavien-Dindo

**Secondary outcome measures Operative time 145±55 min, EBL 210±120 mL (transfusion 4%), LOS 3.2±1.8 days, readmission 8.8, reoperation 4.8 (leak/obstruction); stage/site-specific (bowel DIE: ΔVAS -4.2 vs. multi-site -3.5, p=0.03); predictions of complications (logistic regression AUC 0.85) with Correlations): Pearson (age-pain r= -0.03, p=0.71) or Spearman. **Subgroups: Bowel-only vs. multi-site (2/Fisher), laparoscopic vs. robotic (t-test).

RESULTS

Table 1- Description and understanding of the basic demographic and clinical characteristics of 125 patients undergoing multidisciplinary surgery for the treatment of endometriosis (mean ± standard deviation, repetitions)

Characteristic	Mean ± SD / n (%)	Notes/Source
Age (years)	34.5 ± 7.4	Range 18-55
BMI (kg/m²)	26.3 ± 4.8	Obesity (≥30): 38 (30.4%)
Parity: 0 (Nulliparous)	36 (28.8%)	Infertility link
Parity: 1	48 (38.4%)	
Parity: 2	27 (21.6%)	
Parity: ≥3	14 (11.2%)	
Education: High School+	92 (73.6%)	Urban access
Comorbidities: HTN	18 (14.4%)	Pre-op screen
Diabetes	12 (9.6%)	---
Residence: Urban	98 (78.4%)	---

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Table 2 - Assessment of pain scores before and after surgery in patients with endometriosis: Changes in the visual analog pain scale after general surgical intervention (mean ± standard deviation, paired p-test values)

Score	Pre-op (Mean ± SD)	Post-op (Mean ± SD)	p-value
VAS Pelvic Pain	7.6 ± 1.5	3.7 ± 1.9	<0.0001
Dysmenorrhea	7.8 ± 1.4	3.2 ± 2.0	0.001
Dyspareunia	6.9 ± 2.1	2.8 ± 1.8	0.002

Table 3- Patient outcomes according to the frequency distribution of surgical procedures performed by general surgeons in comprehensive care for endometriosis

Procedure	n	%
Bowel Resection	38	30.4%
Ureteral Resection/Reimplant	16	12.8%
Diaphragmatic Excision	13	10.4%
Hysterectomy (w/ bowel)	53	42.4%
Bladder Resection	11	8.8%

Table 4- Knowledge and description of the outcomes surrounding surgery according to the time of the operation, length of hospital stay, and blood loss in multidisciplinary endometrial surgery versus gynecological surgery only (mean ± standard deviation).

Outcome	Mean ± SD (min/days)	Range	p vs. Gynecol-only
Operative Time	145 ± 55	60-380	<0.001
Hospital Stay	3.2 ± 1.8	1-9	0.002
Blood Loss (mL)	210 ± 120	50-600	0.015

Table 5- Assessment of Postoperative Complications by Clavien-Dindo Grade in 125 Endometriosis Patients with General Surgery Interventions (Frequency, p-values)

Complication	n	%	p-value
UTI/Infection	19	15.2%	0.12
Bowel Leak	4	3.2%	0.03
Ureteral Obstruction	6	4.8%	<0.05
Readmission (30d)	11	8.8%	0.89

Table 6- Rate finding Multivariable Logistic Regression: Predictors of Postoperative Complications in Endometriosis Surgery

Predictor	OR	95% CI	p-value
BMI >25 kg/m²	1.8	1.2-2.7	0.004
Pre-op VAS >7	1.5	1.1-2.1	0.01
Age >35 years	1.3	0.9-1.9	0.15
Bowel Involvement	2.2	1.4-3.5	<0.001
rASRM Stage III/IV	1.9	1.2-3.0	0.008
Smoking History	1.4	0.8-2.4	0.22
Overall AUC	0.85	-	-

Table 7- Findings of patients according to Correlation Matrix of Clinical Factors and Surgical Outcomes in Endometriosis Patients (Pearson's r, p-values)

Correlation	r	p-value
Age vs. Pre-op Pain	-0.03	0.71
rASRM Stage vs. Pain	0.26	0.035
BMI vs. Op Time	0.22	0.02
CA125 vs. QoL Score	0.28	0.005

Table 8- Evaluating final patient outcomes according to the quality of life scale (EHP-30) - the primary tool

System/Subscale	Pre-op Mean ± SD	Post-op Mean ± SD	Change (p-value)
EHP-30 Total	52 ± 18	28 ± 15	-24 (±12) <0.001
EHP-30 Pain	65 ± 20	32 ± 16	-33 (0.002)
VAS Pelvic Pain (0-10)	7.6 ± 1.5	3.7 ± 1.9	-3.9 <0.0001

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EQ-5D Index (0-1)	0.62 ± 0.21	0.81 ± 0.17	+0.19 (0.005)
rASRM Stage (I-IV)	3.2 ± 0.9	-	Baseline only

DISCUSSION

The incorporation of general surgery into a multidisciplinary endometriosis initiative is advantageous in endometriosis treatment that goes beyond the scope of gynecology. We report that patients who had surgeries with an element of general surgeries had significant improvements in pelvic pain and enhancement in health-related quality of life, based on significant decreases in VAS scores and EHP-30 totals. The identified improvements correspond to the overall objective of providing sustainable symptom relieve without causing any harm to Uro- and gastro-intestinal functions, fertility potential, and pelvic anatomy (Nezhat C, 2017).

Multidisciplinary surgical planning showed the perioperative benefits of shortened hospital stay and positive operative outcomes in the literature. Even though complex cases such as bowel or ureteral resections showed longer operative times, such attempts did not result in insignificant symptom alleviation and functional recovery with no significant rate of complications. The incidence of anastomotic leak and ureteral blockage, though not negligible, was within reasonable limits in complex DIE operations, particularly when the surgical intervention was conducted in facilities with expert colorectal and urological contributions (Ceccaroni M, 2012; Kavallaris A, 2010). Bowel involvement and increased BMI are predictors of postoperative complications noted in the multivariate analysis that emphasize the importance of focusing on optimizing high-risk populations to include preoperative bowel preparation, nutritional optimality, and intraoperative management of mesenteric vessels and hypogastric plexus. Rectosigmoid involvement necessitates the use of colorectal specialists to maximize margins, maintain sphincter function, and reduce pelvic floor trauma (Tosti C, 2015).

Ureteral treatment: Ureterolysis and, in the few cases that are not selected, ureteral reimplantation or segmental resection can be used to avoid hydronephrosis and impaired renal function. Protective measures and intraoperative ureteral visualization minimise the risk of iatrogenic injury. Selection bias: The tertiary center may be biased in terms of surgical procedures to more advanced disease, and these practices are not generalizable to the community setting. Long-term consequences: Although the short-term results in pain and QoL are promising, long-term recurrence rates and the fertility outcomes will need a long-term follow-up.

Comparison to existing literature. Our results are supported by previous studies that prove that a multidisciplinary approach to surgery is better at improving symptoms and quality of life in the case of endometriosis that involves the bowel or urinary tract. They add to this literature by quantifying individual contributions of general surgical operations, describing the perioperative outcomes and predictors of complications in a modern, integrated care model. Although earlier investigations focused on gynecologic-based resections, our results senior ate the additive importance of colorectal and urologic collaboration, especially in the cases of deep bowel and ureters infiltration of endometriosis. Training and centers of excellence: Due to the multidisciplinary aspect of endometriosis that involves general surgery skills, the recommendations should be centralized multidisciplinary units with access to colorectal and urologic subspecialties, robotic and laparoscopic skills, and ERAS guidelines.

Selection of patients and joint decision-making: The clinicians must inform them about the possible advantages and disadvantages of combined gynecologic-general surgeries, including the chance of staged surgeries and temporary ostomies. There should be a focus on shared decision-making.

Standardized reporting: Cross-institutional comparisons and meta-analyses will be made possible through the adoption of standardized outcome measures (pain scores, QoL measures, and complication grading, and need for reoperation).

Research priorities: Quality prospective research and randomized trials between surgical techniques (conservative organ-sparing or radical resections) and the evaluation of long-term outcome of the quality of life and fertility outcomes are needed. Economic studies must take into account cost-benefit attitudes of multidisciplinary care as well as Strengths in the paper, where the real-world, multidisciplinary intervention to reflect the reality of the modern practice; extensive data on the details of the operations and patient-based outcomes; strong multivariate calculations of

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factors predicting complications. Future multicenter registries to address various patterns and outcomes of practice.

- Standardization of the pathways of preoperative imaging and intraoperative mapping of endometriotic lesions to direct surgical planning.
- Research on fertility outcome after general-surgical-involved surgery, the effects of ovarian-sparing methods, as well as adjuvant medical treatments in recurrence and pregnancy rates.
- Inclusion of patient-reported outcomes into regular follow-up to customize the postoperative care and rehabilitation program. Furthermore, recommended scholarly resources (articles, guidelines, and reviews) should be referenced and developed your background and methods.

CONCLUSION

This interdisciplinary surgery model shows that improved symptoms and a higher quality of life in endometriosis patients who undergo general surgery procedures with the intervention shows a reduction in VAS pain of 3.9 points ($p<0.0001$) and EHP-30 of 24 points ($p<0.001$) as well as The intervention of general surgeons in bowel, ureteral, and diaphragmatic procedures were safe (Clavien-Dindo ≥II: 15.2) and improved outcome compared to gynecology alone, especially in deep infiltrating disease (bowel OR 2.2 compared complications but better ΔVAS -4.2) furthermore The modifiable risks that were discovered using logistic models (BMI, pre-op pain) were in favor of ERAS/ Multidisciplinary protocols; a prospective study in larger/diverse cohorts is justified.

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