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Pre-operative GnRH agonist use and surgical outcomes in rectovaginal/colorectal endometriosis: an international multicentre prospective cohort study

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ABSTRACT

Background: Rectovaginal/colorectal endometriosis is severe form of endometriosis requiring complex surgery, where pre-operative gonadotrophin releasing hormone agonists (GnRHa) are used to improve the surgical outcomes but the evidence supporting this is limited.

Objectives: To evaluate the association between pre-operative use of GnRHa and perioperative and postoperative complications in patients undergoing surgery for rectovaginal or colorectal endometriosis.

Methods: We analysed prospectively collected data from British Society for Gynaecological Endoscopy-accredited endometriosis centres between 2009 and 2021. Multivariable logistic regression analysis was performed to model the odds of each complication by pre-operative GnRHa use, controlling for patient age, body mass index, smoking status, whether a hysterectomy was performed, history of previous endometriosis surgery and surgical complexity.

Main Outcome Measures: The association of GnRHa use with perioperative and postoperative complications.

Results: We included 9,433 patients aged 18-55 years from 101 specialist endometriosis centres from six countries including UK, USA, Sri Lanka, Saudi Arabia, Turkey and Iran. Patients receiving pre-operative GnRHa were associated with higher rate of perioperative complications [odds ratio (OR): 1.31, 95% confidence interval (CI): 1.08-1.59, *P*=0.007], late complications (OR: 1.477, 95% CI: 1.15-1.9, *P*=0.002) and pelvic haematoma (OR: 2.251, 95% CI: 1.41-3.64, *P*<0.001). After controlling for confounding factors, GnRHa use remained significantly associated with colostomy (aOR: 4.05: 95% CI: 1.51-12.7, *P*=<0.001] pelvic haematoma (aOR: 3.08, 95% CI: 1.72-5.75, *P*<0.001) and abscess (aOR: 2.25, 95% CI: 1.10-4.79, *P*=0.029). Health related quality of life (HR-QOL) improved in the Pre-GnRHa group at 12 months and 24 months (mean difference 2.09/100, 95% CI, 0.27-3.92, *P*=0.025) and (mean difference 2.85/100, 95% CI 0.55-5.16, *P*=0.015).

Conclusions: Pre-operative use of GnRHa has been associated with a higher incidence of perioperative and late complications, including significantly increased odds of colostomy, pelvic hematoma and abcess formation. There is need of careful patient counselling and further prospective research to clarify the pre-operative use of GnRHa in rectovaginal/colorectal endometriosis.

What is New? There is need of caution use of pre-operative GnRHa in deep rectovaginal/colorectal endometriosis surgery due to increased association of the risks of complications such as colostomy, pelvic haematoma and abcess. Despite long-term improvement in HR-QOL, there is need for careful patient selection and counselling.

Keywords: Endometriosis, rectovaginal, colorectal, GnRHa, surgical complications

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Introduction

Deep endometriosis (such as rectovaginal/colorectal endometriosis) is a severe form of endometriosis that commonly presents with pelvic pain, deep dyspareunia, dysmenorrhea, and dyschezia. Treatment options include both medical and surgical approaches with both believed to have benefits of reducing pain and improving health related quality of life (HR-QOL).[1] In the United Kingdom the use of medical therapies including gonadotrophin releasing hormone analogues (GnRHa) as a pre-operative adjunct to surgical therapy is recommended for severe endometriosis.[2] Surgery for rectovaginal endometriosis is challenging and commonly associated with complications.[3] Pre-operative GnRHa is believed to facilitate surgery by reducing inflammation, vascularisation, and adhesions, however, there is limited data to support this.[4]

International guidance is currently divided with discrepancies between the National Institute for Health and Care Excellence and European Society of Human Reproduction and Embryology (ESHRE) in the recommended role of pre-operative GnRHa. The updated ESHRE guidelines highlighted less certainty of its pre-operative role.[1] British Society for Gynaecological Endoscopy (BSGE) has one of the largest pools of prospectively collected data from patients undergoing deep rectovaginal/colorectal endometriosis surgery, including information about pre-operative GnRHa use.[5]

The aim of this study is to evaluate the association between pre-operative GnRHa use with perioperative and postoperative complications following deep rectovaginal/colorectal endometriosis surgery. Moreover, we assessed the HR-QOL in patients who received pre-operative GnRHa and had deep rectovaginal/colorectal endometriosis surgery, with follow-up periods extending up to two years postoperatively

Methods

Data Collection

The BSGE database is a comprehensive database which is used to capture data on large international multicentre cohort of patients undergoing complex endometriosis surgery (defined by endometriosis surgery requiring dissection of the para-rectal space). These patients are prospectively registered on the BSGE database from 101 specialist endometriosis centres from six countries including UK, USA, Sri Lanka, Saudi Arabia, Turkey and Iran. The BSGE surgical information collection system is reliable cloud-based database system for gynaecological procedures. More detailed information on how the data is collected can be found on the BSGE website.[6]

The database allows collection of information related to patient symptoms and HR-QOL data collected pre-operatively, 6-, 12- and 24-months post-operatively, as well as surgical findings, details of the procedure and any intraoperative/perioperative and postoperative complications. The intraoperative complications are defined as procedure related injury or harm recognized during the procedure. Postoperative complications are defined as procedure-related complications, categorised as either early complications (when reported within 48 hours) or late complications (this includes complications reported up to 6-12 week following the primary procedure). BSGE has defined criteria and classification of specific postoperative complications that are entered in the database by individual clinicians at their respective centres. To prevent the diversion from primary outcomes to investigate the rate of perioperative and postoperative complications, we have not included the detailed information on pain scores, bladder and bowel symptoms. Similarly, for HR-QOL although BSGE questionnaire incorporates the EQ-5D-3L questionnaire in conjunction with EuroQol-visual analogue scales (EQVAS) scores, we limited the information to EQVAS scores which is a standard visual analogue scale, used in recording an individual's rating of their HR-QOL by paper questionnaire.

The study was approved by the BSGE Scientific Advisory Group. All patients entered onto the BSGE database provided informed consent for their anonymised data to be included in research.

Patient Population

We included all patients on the BSGE database undergoing surgery for deep rectovaginal/colorectal endometriosis from 2009-2021. All the patients that were included, had dissection of the para-rectal space with either a rectal shave, disc, or segmental resection of rectovaginal or colorectal endometriosis. The patients included had intra or postoperative complication records and had a pre-operative and at least one post-operative questionnaire response for the analysis of HR-QOL scores. For the primary analysis, the patients were divided into two groups based on either having pre-operative GnRHa or not. In the manuscript, patients who had received pre-

operative GnRHa are described as Pre-GnRHa whereas the patient who did not receive any form of pre-operative GnRHa are described as the nPre-GnRHa. We gathered data on the patient's age, body mass index (BMI), smoking status, hysterectomy, prior endometriosis surgery, and surgical complexity. High surgical complexity was defined as involving bladder nodule excision, ureteric nodule excision or bowel resection (disc or segmental). Some of the important information like menopausal status, adenomyosis, fibromyalgia and mental health problems are not captured in the BSGE database.

Statistical Analysis

All data manipulation, graph production and statistical analysis was performed in R Studio using R version 4.2.3 for Windows (Copyright 2023, the R Foundation for Statistical Computing). Demographic differences between groups were compared using independent samples t-tests and chi-squared test of proportions. *P*-value of <0.05 were considered to be statistically significant throughout. The raw differences in complication rates between patients receiving vs not receiving pre-operative GnRHa were compared using odds ratios (OR) and tested for statistical significance using the chi squared difference of proportions test, or Fisher's exact test where any group size was <5. As these groups differed in demographics and surgical complexity, multivariable analysis was performed using logistic regression to model the odds of each complication by pre-operative GnRHa use, controlling patient age, BMI and smoking status, whether a hysterectomy was performed, history of previous endometriosis surgery and surgical complexity.

We analysed the effect of treatment on HR-QOL using mixed-effects linear regression, modelling the score at each timepoint by GnRH analogue use pre-operatively, controlling for age, BMI and smoking, surgical approach (laparoscopic vs. laparotomy), hysterectomy, and a random intercept for each patient, using a time x treatment group interaction term as the measure of the difference in outcome. As age and the type of bowel surgery performed were predictive of symptom improvement, this effect was also controlled for with a timepoint interaction term.

Results

Patients' Cohort and Demographics

Our analysis included 9,433 surgical cases, of these 3,275 (34.7%) patients received pre-operative GnRHa (Pre-GnRHa), 6,158 patients did not receive Pre-operative GnRHa (nPre-GnRHa). Age and BMI were assessed graphically for normality and were described as mean (Figures 1, 2). The data exhibit negligible skewness, and relatively symmetrical distribution with mild tails. The descriptive statistics for the age revealed a mean age 36.4 and range between 18-55 years. Similarly, the mean BMI was 26.4, with a range between 15-45. The mean BMI and age were similar for both groups, however large numbers of patients allowed for statistical significance even when this may not necessarily be a clinically significant difference.

Overall, the type of bowel surgery performed were shaving 8,399 (89.1%), disc resection 272 (2.9%) and segmental resection in 762 (8%) cases. Of these, 2,461 (26.1%) patients underwent a hysterectomy. The differences in the demographics of the patients who received Pre-GnRHa and those who did not receive the nPre-GnRHa can be seen in Table 1.

Overall Complication Rate

Overall, the perioperative complication rates for the whole cohort were as follows: haemorrhage (≥1 L)

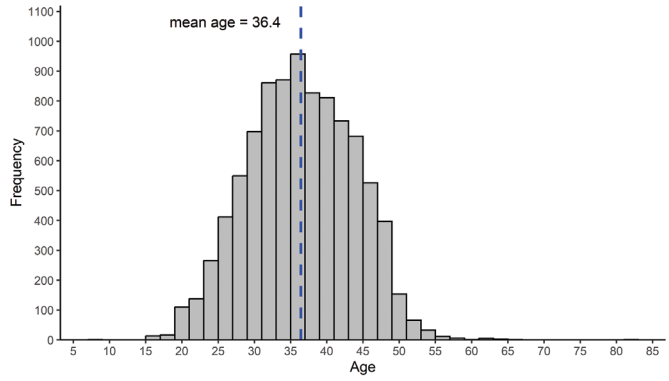

Figure 1. Age histogram.

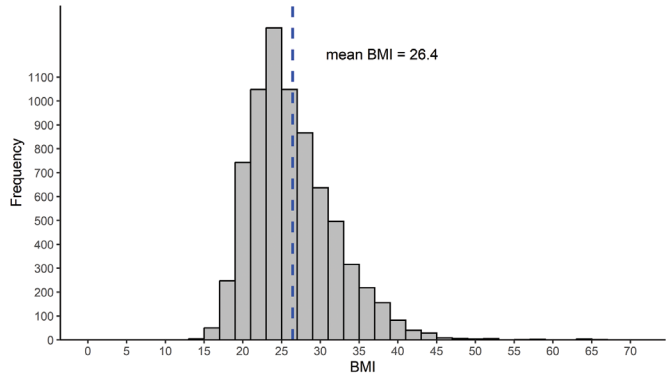

Figure 2. BMI histogram.

BMI: Body mass index.

Table 1. Demographic and operative difference in Pre-GnRHa vs. nPre-GnRHa groups (n=9433).

Characteristics	Pre-GnRHa group (n=3275)	n (pre-GnRHa) group (n=6158)	*P*-value
Age	36.9 (SD: 7.31)	36.2 (SD: 7.31)	<0.001*
BMI	26.7 (SD: 5.52)	26.2 (SD: 5.52)	<0.001*
Smoking	308 (9.4%)	584 (9.5%)	0.041*
Hysterectomy	1061 (32.4%)	1400 (22.7%)	<0.001*
Bowel surgery			
- Shaving	2796 (85.4%)	5603 (91%)	<0.001*
- Disc resection	97 (3%)	175 (2.8%)	
- Segmental resection	382 (11.7%)	380 (6.2%)	
Surgical complexity			
High	772 (23.6%)	1201 (19.5%)	<0.001*
Low	2503 (76.4%)	4957 (80.5%)	

*Statistically significant *P*<0.05, BMI: Body mass index, Pre-GnRHa: Group received pre-operative gonadotrophin releasing hormone analogues, nPre-GnRHa: Group with no pre-operative GnRH analogues, SD: Standard deviation.

97 (1.3%); unexpected bowel injury 90 (1.2%); and conversion to laparotomy in 87 (1.2%) cases. Whereas the postoperative complication for the whole cohort included: pelvic haematoma 72 (1.3%); pelvic abscess 39 (0.7%); and bowel leak in 35 (0.6%) case (Table 2).

Perioperative Complications

Compared to the nPre-GnRHa group, the patients in the Pre-GnRHa having any form of deep rectovaginal/colorectal endometriosis surgery demonstrated significantly greater odds of any perioperative complications [OR: 1.31, 95% confidence interval (CI): 1.08-1.59, *P*=0.007]. The odds of colostomy and ileostomy were higher in the Pre-GnRHa group, (OR: 2.677, 95% CI: 1.16-6.5, *P*=0.016 and OR: 2.076, 95% CI: 1.14-3.81, *P*=0.014) respectively when compared to the nPre-GnRHa group (Table 2). When multivariable regression analysis was done to control for confounding factors including age, BMI, smoking, hysterectomy, surgical complexity and previous endometriosis surgery, the result showed that the patients in the Pre-GnRHa group had increased odds of colostomy (OR: 3.953, 95% CI: 1.48-12.4, *P*=0.008). However, there was no statistically significant difference in the rates of bleeding or surrounding organ injury including bowel, bladder, blood vessels and ureter. There was no significant difference in odds of conversion to laparotomy between the nPre-GnRHa and the Pre-GnRHa groups (Table 3).

Postoperative Complications

In patients having any form deep rectovaginal/colorectal endometriosis surgery, Pre-GnRHa had significantly greater odds of any late postoperative complications compared to the nPre-GnRHa (OR: 1.477, 95% CI: 1.15-1.9, *P*=0.002). The odds of pelvic haematoma was higher with Pre-GnRHa compared to the nPre-GnRHa group (aOR: 2.251, 95% CI: 1.41-3.64, *P*=0.001) (Table 2). After controlling confounding factors including age, BMI, smoking, hysterectomy, surgical complexity and previous endometriosis surgery, the patients receiving Pre-GnRHa had increased odds of pelvic haematoma (aOR: 3.08, 95% CI: 1.72-5.75, *P*<0.001). The odds of having a pelvic abscess were also higher with Pre-GnRHa (aOR: 2.25, 95% CI: 1.10-4.79, *P*=0.029). However, there were no statistically significant difference in urinary or bowel leak or fistula formation, the odds of sepsis in the Pre-GnRHa group and the nPre-GnRHa group was not statistically significantly different (Table 3).

Health Related Quality of Life EuroQol-visual Analogue Scales

The follow-up rates were 86.7% at 6 months (4832), 60.1% (3351) at 12 months and 33.9% (1891) at 24 months. Postoperative HR-QOL scores showed statistically significant improvement in the Pre-GnRHa group at 12 months (mean difference: 2.09/100, 95% CI: 0.27-3.92, *P*=0.025*) and 24 months (mean difference: 2.85/100, 95% CI: 0.55-5.16, *P*=0.015*). However, no statistically significant difference was seen for HR-QOL pre-operatively and at 6 months postoperatively between Pre-GnRHa and nPre-GnRHa groups (Tables 4, 5, Figure 3).

Table 2. Complications rate nPre-GnRHa vs. Pre-GnRHa group.

Complication	Pre-GnRHa (%)	nPre-GnRHa (%)	Odds ratio (95% CI)	*P*-value (chi²)
Overall perioperative complications	176 (6.3)	266 (4.9)	1.31 (1.08-1.59)	<0.001*
Haemorrhage litre	40 (1.4)	57 (1)	1.38 (0.91-2.06)	0.124
Ureteric injury	21 (0.8)	26 (0.5)	1.58 (0.88-2.82)	0.117
Unexpected bowel injury	28 (1)	62 (1.1)	0.88 (0.56-1.37)	0.575
Unexpected bladder injury	12 (0.4)	30 (0.6)	0.79 (0.38-1.5)	0.465
Unexpected vascular injury	11 (0.4)	12 (0.2)	1.79 (0.77-4.13)	0.158
Epigastric injury	2 (0.1)	3 (0.1)	1.33 (0.16-8.75)	0.773
Conversion to laparotomy	35 (1.3)	52 (1)	1.32 (0.85-2.02)	0.210
Colostomy	14 (0.5)	9 (0.2)	3.02 (1.31-7.34)	<0.001*
Ileostomy	24 (0.9)	20 (0.4)	2.35 (1.29-4.32)	<0.001*
Death	1 (0)	2 (0)	1.04 (0.03-12.82)	0.984
Overall late complications	116 (5.3)	142 (3.7)	1.48 (1.15-1.9)	<0.001*
Pelvic haematoma	42 (1.9)	30 (0.8)	2.51 (1.57-4.07)	<0.001*
Pelvic abscess	20 (0.9)	19 (0.5)	1.88 (0.99-3.57)	0.046 *
Urinary tract leak	6 (0.3)	15 (0.4)	0.72 (0.25-1.79)	0.477
Bowel leak	13 (0.6)	22 (0.6)	1.06 (0.51-2.08)	0.888
Urinary tract fistula	1 (0)	5 (0.1)	0.4 (0.02-2.57)	0.323
Bowel fistula	8 (0.4)	7 (0.2)	2.03 (0.72-5.9)	0.162
Severe sepsis	12 (0.6)	14 (0.4)	1.53 (0.69-3.34)	0.28
Pulmonary embolism	1 (0.0)	6 (0.2)	0.33 (0.01-2.01)	0.231

*Statistically significant *P*<0.05, Total cases: 9,433, Missing data for perioperative complications: Cases 1,187 (12.6%), Missing data for postoperative complications: Cases 3,396 (36%).
Pre-GnRHa: Group received pre-operative gonadotrophin releasing hormone analogues, nPre-GnRHa: Group with no pre-operative GnRH analogues, CI: Confidence interval.

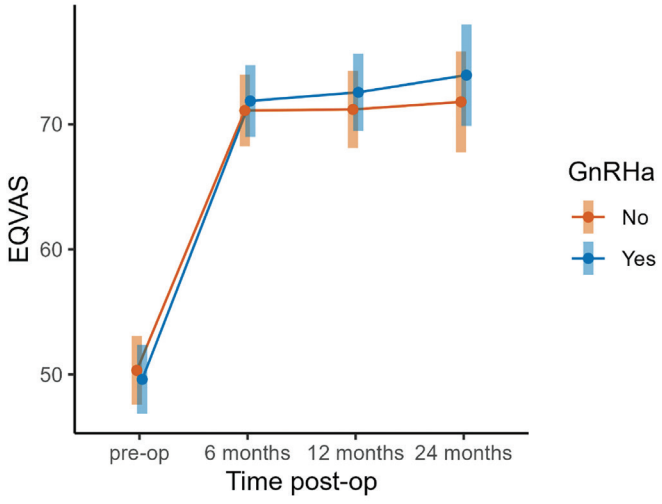

Figure 3. EQVAS scoring.

EQVAS: EuroQol-visual analogue scales, GnRHa: Gonadotrophin releasing hormone analogues.

Death

Overall, there were 3 cases of death reported in the database of the cohort of patients having surgical treatment for deep rectovaginal/colorectal endometriosis. There was no statistically significant difference in odds of death between groups, including after controlling for confounding factors with *P*=0.897, OR: 0.85 (95% CI: 0.04-9.0) (Tables 2, 3). We could not explore this serious complication in detail as the relevant information is not routinely collected by the BSGE database and are held locally by the individual hospital.

Missing Data

There was total 9,433 patients that fulfil the inclusion criteria to be considered in the analysis. However, there was missing data for perioperative complications in 1,187 (12.6%) patients and for postoperative complications the missing data was more for about 3,396 (36%) of patients (Table 6). The information on the possible reasons for missing data for perioperative and late complications was not captured by individual centers and therefore was not available to analysis.

Table 3. Multivariable logistic regression, controlling for age, BMI, smoking, hysterectomy, surgical complexity and previous endometriosis surgery.

Complication	Odds ratio (95% CI) Pre-GnRHa vs. nPre-GnRHa group	*P*-value
Overall perioperative complications	1.22 (0.97-1.54)	0.091
Haemorrhage litre	1.15 (0.70-1.86)	0.586
Ureteric injury	1.46 (0.76-2.79)	0.254
Unexpected bowel injury	0.78 (0.46-1.28)	0.335
Unexpected bladder injury	0.67 (0.29-1.44)	0.322
Unexpected vascular injury	1.61 (0.62-4.14)	0.319
Epigastric injury	3.64 (0.34-79.87)	0.298
Conversion to laparotomy	1.05 (0.63-1.75)	0.841
Colostomy	4.05 (1.51-12.7)	<0.001*
Ileostomy	1.67 (0.85-3.33)	0.135
Death	0.85 (0.04-9.07)	0.897
Overall late complications	1.51 (1.13-2.00)	<0.001*
Pelvic haematoma	3.08 (1.72-5.75)	<0.001*
Pelvic abscess	2.25 (1.10-4.79)	0.029*
Urinary tract leak	0.64 (0.20-1.8)	0.412
Bowel leak	1.38 (0.61-3.06)	0.431
Urinary tract fistula	0.28 (0.02-1.78)	0.252
Bowel fistula	1.97 (0.56-7.76)	0.299
Severe sepsis	1.47 (0.57-3.81)	0.414
Pulmonary embolism	Data insufficient for analysis	

*Statistically significant *P*<0.05, Total cases: 9,433, Missing data for perioperative complications: Cases 1,187 (12.6%), Missing data for postoperative complications: Cases 3,396 (36%).
Pre-GnRHa: Group received pre-operative gonadotrophin releasing hormone analogues, nPre-GnRHa: Group with no pre-operative GnRH analogues, CI: Confidence interval.

Table 4. Pre-operative mean difference in HR-QOL between Pre-GnRHa vs. nPre-GnRHa group.

	Pre-GnRHa (mean)	nPre-GnRHa (mean)	*P*-value
EQVAS	53.5	53.9	0.4

Pre-GnRHa: Group received pre-operative gonadotrophin releasing hormone analogues, nPre-GnRHa: Group with no pre-operative GnRH analogues, EQVAS: EuroQol-visual analogue scales.

Table 5. Postoperative mean differences in HR-QOL between Pre-GnRHa vs. nPre-GnRHa groups.

	6 months (95% CI, *P*-value)	12 months (95% CI, *P*-value)	24 months (95% CI, *P*-value)
EQVAS	1.48/100 (-0.13-3.1, *P*=0.072)	2.092/100 (0.27-3.92, *P*=0.025)*	2.85/100 (0.55-5.16, *P*=0.015)*

*Statistically significant *P*<0.05. Pre-GnRHa: Group received pre-operative gonadotrophin releasing hormone analogues, nPre-GnRHa: Group with no pre-operative GnRH analogues, EQVAS: EuroQol-visual analogue scales, HR-QOL: Health related quality of life, CI: Confidence interval.

Table 6. Missing data for perioperative and late complications.

Total cases	Missing cases no perioperative	Missing cases % perioperative	Missing cases no late complication	Missing cases % late complications
9,433	1,187	12.58%	3,396	36%

Discussion

Key Findings

The result of our study provides evidence of an association between pre-operative GnRHa use with higher complication rates at the time of surgery for deep rectovaginal/colorectal endometriosis with increased odds of colostomy, pelvic haematoma and abcess, although the HR-QOL outcomes appear to be better in the postoperative years in patients who received pre-operative GnRHa. The recent ESHRE guidelines found insufficient evidence to recommend pre-operative medical therapies to improve outcome.[1] Cochrane reviews by Chen et al.[4], 2020 and Yap et al.[7], had evaluated the role of pre and post-surgical medical therapy for endometriosis surgery and highlighting inconclusive efficacy of medical therapy as an adjunct for endometriosis surgery, however, it had not evaluated the complication rates. There are no previous studies evaluating the role of pre-operative GnRHa and postoperative complication rate with which we can compare our study findings.

It is important to acknowledge that surgical complexity may represent the greatest predictor of major intraoperative complications rather than disease severity. The data we have available does not allow for a granular view of the complexity of surgery. The use of pre-operative GnRHa is not believed to influence these wider complexities.[8,9] There are previous studies evaluating the ways in which pre-operative GnRHa may provide benefit through reduced inflammation, reduced vascularisation of endometriosis lesions, reduced adhesions and reduced risk of recurrence.[10,11] However, there is evidence of GnRHa induced vaginal atrophy in patients undergoing hysterectomy that can negatively influence wound healing and increase the risk of vaginal cuff dehiscence.[8] A cases series described the increased risks of vaginal cuff dehiscence with the use of pre-operative GnRHa, however, the evidence was weak.[12]

Laparoscopic segmental colorectal resection increases the risk of major complication including rectovaginal fistula and pelvic abscesses.[13] Previous studies by Benbara et al.[14], 2008 and Kondo et al.[15], reported increased risk of major complications and digestive fistulas with vaginal opening and ileocaecal resection. The overall complications rate after conservative surgery were lower and the risk of complications increased if additional surgery, such as ureterolysis, uterosacral ligament resection, and hysterectomy were required.[16] Opening of the vagina and extensive electro coagulation can lead to necrosis of the posterior vaginal cuff with a higher risk for rectovaginal fistulae and abscess.[17]

Angioni et al.[18], had evaluated the effect of GnRHa as a post-surgical medical treatment in patients with rectovaginal endometriosis and the result showed improvement of symptoms in those patients in whom total eradication of the pathology was not feasible. Our findings suggest that there may be a benefit of using pre-operative GnRHa to improve HR-QOL, although this needs to balance against the greater complication rates.

Strengths and Limitations of the Study

The BSGE database represents the largest prospective dataset of surgically managed deep rectovaginal/colorectal endometriosis. This includes about 9,433 cases of deep rectovaginal/colorectal endometriosis surgery, together with comprehensive information on demographics, surgical technique, perioperative and postoperative complications. The large sample size enabled a multivariable analysis controlling for demographic and clinical variations among the groups. This multicentre study reduces bias arising from systemic variation in practice and enables confidence that the results reflect the real value of complications. There are annual governance measures for each endometriosis centre to ensure validity and comparability of data from multiple centres.

The primary limitation of this research is the study design and lack of randomization. We cannot rule out the possibility that the higher complication rates in the Pre-GnRHa group that may be due to more complex endometriosis in this group compared to the nPre-GnRHa group, hence they were more likely to be given this medication pre-operatively. This may give rise to bias negatively influencing the results against GnRHa use. There is missing data in our study making it challenging to determine the complication rate with accuracy. There were challenges controlling for the variation in the clinical characteristics like severity of adhesions, size of bowel nodule, distance from the anal verge, adenomyosis, fibromyalgia, depression/anxiety, menopausal status, postoperative GnRHa use that were not captured on the BSGE database during multivariate analysis.

Clinical Implications and Future Research

We recommend future randomised controlled trials (RCT's) evaluating pre-operative medical management as an adjunct to deep rectovaginal/colorectal

endometriosis surgery. We were able to control for a number of potential confounding factors including age, BMI, smoking, hysterectomy, surgical complexity and previous endometriosis surgeries however, there may be other factors mentioned above, that we were not able to control yet may influence the risk of complication. To mitigate against this, we suggest future RCT include the #ENZIAN classification.

Moreover, other causes that can affect HR-QOL such as adenomyosis, fibromyalgia, depression/anxiety, menopausal status could not be adjusted for multivariable analysis as the information about these conditions are not routinely collected in the BSGE database. Future RCT's would provide greater clarity on the role of GnRHa as a pre-operative adjunct to surgery.

Conclusion

This is the largest prospective international study evaluating the role of pre-operative GnRHa use for surgical treatment of deep rectovaginal/colorectal endometriosis including shaving, disc resection or segmental resection. The results suggest an increased risk of perioperative complications with risk of colostomy being significant. Moreover, there is increased risk of overall late complication with association of pelvic haematoma being significantly high with pre-operative GnRHa use. There is significant long term improvement post-operatively in HR-QOL up to two years for the patient who used pre-operative GnRHa. The results of our study suggest cautious use of pre-operative GnRHa balancing the increased risk of perioperative and postoperative complications against improvement in HR-QOL. When counselling patients ahead of surgery for rectovaginal/colorectal endometriosis adequate discussion is needed of the increased risk of complication yet greater improvement in HR-QOL.

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Informed consent: The BSGE Scientific Advisory Group approval was taken for this study. All patients in the BSGE database gave written consent for the use of the anonymised data in research. All included patients gave written consent for their anonymised data to be used in research.

Data sharing: Data supporting the results in the paper are archived in the Institutional electronic system. Additional data and related information are available from the corresponding author upon request.

Transparency: The authors affirm that the manuscript is an honest, accurate, and transparent account of the studies assessed. There are no important aspects of the studies omitted.

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