Unexpected Subserosal Gastrointestinal Stromal Tumor Encountered During Laparoscopic Hiatal Hernia Repair: A Case Series

Kyler Perry OMS-IV; Hallie Wurst MD; Julia Wright BS; Anil Aranha, PhD; Robert Wright MD, FACS

Background

The objective of this study is to determine the incidence of subserosal gastrointestinal stromal tumors (GIST) discovered during hiatal hernia repair and to evaluate whether there are any clinical indicators or morbidities associated with this discovery.

Introduction

Gastrointestinal stromal tumors (GISTs) are neoplasms which originate from multipotential mesenchymal stem cells[1]. GIST may arise from any location along the GI tract, but most often are found in the stomach at the gastric fundus[2,3]. Abraham et al.[4] shows 44% of GIST occurring at the outer muscularis propria, 39% at the innermost muscularis, and 17% between the muscle layers, illustrated in Figure 1.

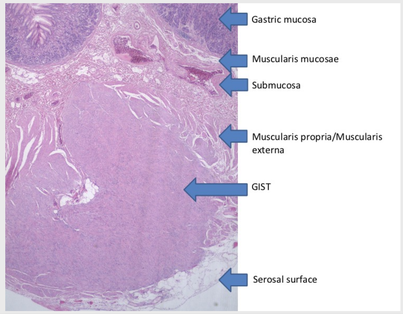


Figure 1. Histology section depicting layers of the stomach from superficial (gastric mucosa) to deep (serosa). GIST is noted in the subserosa.

Nissen fundoplication, an anti-reflux surgery, is one of the most common operations of the upper stomach. To our knowledge, there are no published series describing discovery of GIST during this procedure. Further, the identification and incidence of GIST in a subserosal location (Figure 2) is not well studied, particularly during patients undergoing anti-reflux surgery or paraesophageal hiatal hernia repair.

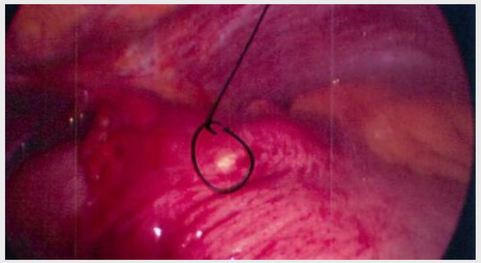


Figure 2. Subserosal GIST during Hiatal Hernia Repair.

Methods

This is a retrospective study of 183 hiatal hernia (HH) surgeries performed at an outpatient surgery center over a three-year calendar timeframe. Patient data: age, gender, race, body mass index (BMI), preoperative diagnosis, surgery type (laparoscopic versus robotic), history of smoking, presence of cancer, hypertension, diabetes, anemia, chest pain, GIST detection during surgery, and pathological and anatomical characteristics of discovered GIST.

Results

The 183 HH surgical patients had a mean age of 55.7 years, 70.5% female, and 94.0% Caucasian. The group had an average BMI of 28.9 Kg/m^2, 44.3% had a history of smoking, and 8.2% were current smokers. Majority (71.0%) of the patients underwent surgery for GERD with laparoscopic surgical technique (92.9%) being the principal approach. Gastrointestinal stromal tumor was most often subserosal in location (85.7%). Age was strongly associated with gender (p=0.007). Patient age > 60 years had higher incidence (8.9%) of GIST (p=0.002) as well as higher prevalence of hypertension (p=0.001) and anemia (p=0.001).

Table 1. Characteristics of Hernia Repair Surgical Patients by Age Group (N=183).

Variable	Entire Group M±SD / n (%)	Age Group < 60 years M±SD / n (%)	Age Group ≥ 60 years M±SD / n (%)	P
Number of Patients (n)	183 (100.0)	104 (56.8)	79 (43.2)	- - - -
Age (years)	55.7 ± 14.4	45.9 ± 10.6	68.6 ± 6.0	- - - -
Gender				0.007
Female	129 (70.5)	65 (62.5)	64 (81.0)	
Male	54 (29.5)	39 (37.5)	15 (19.0)	
Ethnicity				0.875
Caucasian	172 (94.0)	98 (94.2)	74 (93.7)	
Other*	11 (6.0)	6 (5.8)	5 (6.3)	
Body Mass Index (Kg/m^2)	28.9 ± 5.0	28.8 ± 5.0	29.1 ± 5.0	0.751
Tobacco Use				
History	81 (44.3)	41 (39.4)	40 (50.6)	0.130
Current	15 (8.2)	10 (9.6)	5 (6.3)	0.422
Hernia Type				**0.001**
Hiatal/GERD	130 (71.0)	91 (87.5)	39 (49.4)	
Paraesophageal	53 (29.0)	13 (12.5)	40 (50.6)	
Surgery Type				0.349
Laparoscopic	170 (92.9)	95 (91.3)	75 (94.9)	
Robotic	13 (7.1)	9 (8.7)	4 (5.1)	
Concomitant Diseases				
Diabetes	12 (6.6)	7 (6.7)	5 (6.3)	0.913
Hypertension	64 (35.0)	25 (24.0)	39 (49.4)	**0.001**
Cancer	24 (13.1)	11 (10.6)	13 (16.5)	0.243
Anemia	34 (18.6)	11 (10.6)	23 (29.1)	**0.001**
Presence of				
Chest Pain	56 (30.6)	31 (29.8)	25 (31.6)	0.789
GIST	7 (3.8)	0 (0.0)	7 (8.9)	**0.002**

Discussion

Aside from a few case reports of large GIST associated with paraesophageal hernias[1,2,3], the occurrence of subserosal GIST during hiatal hernia repair has not previously been reported. The purpose of the study was to evaluate the incidence of subserosal GIST during hiatal hernia surgical repair and to establish any associated clinical indicators or morbidities. There have been case reports demonstrating malignant transformation of GIST, indicating further importance of identification and removal of these tumors while in the surgical vicinity. The results of our study clearly indicate that age has a significant role to play in the detection of GIST during hiatal hernia surgery.



Figure 3. Subserosal GIST during Hiatal Hernia Repair.

The findings of this study are significant and have relevance to the medical and surgical care of hiatal hernia patients, especially older patients aged 60 years and greater. However, even though the sample of patients analyzed for the study is quite large and may bear merit, they were from a single cluster which may not be illustrative of a diverse sociodemographic or clinical characteristics. Therefore, the results may be a representative of only the population provided care by this surgical clinic, thus limiting the generalizability. Nevertheless, the results of the study on surgical care of hiatal hernia patients are unique, bear clinical importance, have not been reported earlier and warrant further investigation.

Conclusion

GIST was detected only among patients 60 years or older with an incidence rate of 8.9%, therefore indicating a strong association between patient age and presence of GIST during HH surgery. They were most commonly subserosal in location (85.7%). These tumors should be noted, appreciated, and removed appropriately.

References

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