Abstract: Duodenal gastrointestinal stromal tumors (GISTs) are uncommon and constitute a relatively small subset of GISTs which presents a unique dilemma having various surgical options. Two cases of large duodenal GISTs one complicated by massive GI bleed and the other complicated by iatrogenic rupture, arising from the third and fourth parts of the duodenum and not involving the pancreas which was managed by a pancreas sparing duodenal resection is presented. The literature is also reviewed to present the current status on surgical options, outcome, prognostic indicators and the role of Imatinib mesylate in its management.

Keyword: GIST, Bleeding, Pancreas sparing duodenectomy, limited resection

INTRODUCTION
Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract. While GISTs can arise throughout the entire GI tract, they commonly originate from the stomach (50-60%) and small bowel (30-40%). Duodenal GISTs (D-GISTs) represent a rare subset with an overall frequency of 3-5%, but still represent approximately 30% of primary small bowel tumors. Standard treatment of localized GIST is complete surgical excision with negative margins without dissection of clinically negative lymph nodes except in pediatric GISTs. However, the optimal surgical procedure for duodenal GISTs remains to be established. There are currently few reports addressing the surgical procedures for duodenal GISTs. Pancreaticoduodenectomy (PD) or more limited resections (LR) with pancreas preservation such as wedge or segmental resections of the duodenum are proposed according to the tumor presentation (anatomic site and size) and ECOG. Necesity to perform a systematic PD to achieve larger margins has been scarcely studied. It is now established that adjuvant Imatinib improves disease-free survival (DFS) and overall survival (OS). However, its potential role in the neoadjuvant setting has not been specifically explored due to the rarity of these specific localizations. The objective of this study was to analyze the oncological results of series of two cases of Duodenal GISTs.

Case report 1
65 year old female presented with abdominal pain for 2 weeks to a private hospital and found to have mass which was diagnosed as a pseudocyst secondary to pancreatitis. Her serum amylase was 1389 SU. The USG showed a well defined thick-walled hypoechoic foci of size 11.5 X 6.5 cm in the left lumbar region. The CECT showed a well-defined round mass of size 7.3 cm X 9.4 cm in spleno renal angle with heterogenous foci suggestive of infected pseudocyst (Fig:1). Laparotomy was done with external drainage of the abscess cavity. In the postoperative period there was a continuous drainage of 50 -150 ml of clear fluid and the tissue biopsy from the wall showed fibro-fatty and fibrocollagenous tissue with congested blood vessels and areas of ulceration. She was referred to our department. On examination she had generalised neurofibromatosis with drain in a left flank. Repeat Blood amylase and lipase levels were 25 SU and 65 SU respectively, with a Total Count of 4900. Her liver function was normal. A endoscopy showed an Ulcer-proliferative growth about 3X2 cm in the lateral wall of D3 and a biopsy showed a normal mucosa with ectatic blood vessels and inflammatory infiltrate. Drain fluid analysis had an amylase of 509 SU and culture of Staphylococcus aureus sensitive to amikacin and vancomycin. The repeat CECT was suggestive of a heterogenous mass arising from the duodenum or pancreas (Fig: 2). Her tumor markers -CA19- 9 and CEA- were negative. She was cleared for surgery with mild respiratory and cardiac risk. On elective Laparotomy, a 15 X 20 cm mass arising from DJ flexure (Fig:3) was found which was adherent to the Transverse colon with a catheter draining the mass cavity. The pancreas was free and there was no evidence of metastatic lesions in the abdomen. We proceeded to kocherise the duodenum and the tumor was mobilised from pancreas, spleen and kidney. After performing a limited resection of the duodenum containing the tumor, a side to side Duodenojjunostomy (Fig 4) was performed mobilising the duodenum under the Superior Mesenteric Artery pedicle. The transverse colon was resected enbloc with the tumor and a Hartmann’s performed. (Fig:5). The post-operative period was uneventful and diet was resumed on day 5.
The biopsy was reported as GIST with an Immunohistochemistry positive for positive for CD 117. She was started on adjuvant Imatinib. On Relaparotomy for stoma reversal there was no evidence of recurrence. The stoma was taken down and a completion Right hemicolectomy followed by a ileocolic (descending colon) anastomosis was performed. She is on follow-up for 1 year, symptom free and on adjuvant Imatinib.

Case 2 report
A 46yr old male presented with complaints of back pain for 2 years. A urology consult found a lump in the abdomen and referred to the regional cancer centre where a diagnosis of GIST was made following a laparotomy and biopsy. He was started on imatinib 400 mg/day as the 15 cm mass was too large for surgical resection. He subsequently presented with a bout of massive lower GI bleed and referred to the department. At presentation he was pale, tachycardic and a 15 X 10 cm mass was palpable in the umbilical and left lumbar regions. On investigation his hemoglobin was 9 gms% and a CECT abdomen showed a 15 X 10 cm heterogenous mass arising from the small bowel. He underwent a limited resection of the duodenum by transecting at the D2 and jejunal level with linear staplers. The reconstruction was done by a Roux loop used for Gastrojejunostomy. The post —operative period was uneventful and histopathology confirmed GIST with C-KIT positivity. He is on Imatinib 400 mg/day and is on follow up for 2 1/2 years symptom free.

DISCUSSION
The treatment options for borderline resectable GISTS include neoadjuvant Tyrosine Kinase Inhibitors first followed by surgery. But when complicated by bleeding or rupture, it would dictate surgery with Imatinib used as an adjuvant therapy. The series of 2 patients demonstrate that surgery for large GISTs presenting with complications is feasible with minimal morbidity and no evidence of recurrence after adjuvant Imatinib.
Duodenal GISTs are characterized by their complexity related to the anatomy of pancreatic and duodenal area. In one series, most D-GISTs were located in the second portion of the duodenum (33%) while 36% of the lesions were located in the third and fourth portions of the duodenum. Furthermore, 45% of D-GISTs are classified as low risk (Miettinen Risk table for GIST 2002). In one series suggesting that D-GISTs belong to a better prognostic category than other small bowel GISTs, our series both tumors were located in the third and fourth parts of the duodenum and were amenable for local resection.

Pancreatico-duodenectomy in high volume centers has a complication rate of 30% to 50% with an operative mortality of 1% to 7.8%. Furthermore, the prognosis in duodenal GISTs is dependent on tumor biology, tumor size, mitotic count labelling index values and not extensive surgery involving nodal dissection. When feasible, local resection achieves the same rates of R0 resection, DFS and OS as PD. It suggests that a pancreas preserving surgery is preferable when there is no anatomic contraindications, such as size or location (pancreas side or not) or the ability to achieve an R0 margin. In one series, LR exhibited clearly a lower risk of post-operative morbidity,[9] (17% vs. 30%) than PD. PD should be considered for locally advanced tumors. GISTs situated in the second part of the duodenum involving the pancreatic head or involving the bile duct or ampulla. We thus performed a limited resection of the duodenum to achieve an R0 resection with consequent benefit of a good postoperative outcome.

In line with previous data, use of neoadjuvant Imatinib for GISTs is indicated in case of locally advanced GISTs not amenable to resection or pancreas preservation. Indeed, it may facilitate the surgical procedure and increase the chance of preserving normal biliary and pancreatic structures. When PD is eventually required, it is safer when tumor is smaller [9] and may decrease the risk of tumor rupture which is known to have a negative impact on survival. In our series, adjuvant Imatinib was administered in both our patients with no evidence of recurrence during the follow-up period. The incidence of bleeding complications is highest in the duodenum – 87% followed by the small bowel – 60% and Colon -45%. GISTs presenting with massive GI bleed is a rare presentation and the hypervascularity of submucosal area is the usual source of the bleed. Routine investigations cannot locate the source of bleed in many cases. Emergency surgery may be required and there is a high risk for tumor recurrence when GISTs are complicated by bleeding.

CONCLUSION
In conclusion, this series of two patients demonstrates the feasibility of preservation of pancreas when there are no anatomical constraints. Our review of literature suggests that LR exhibits similar survival and smaller morbidity. The administration of Imatinib must be considered before and after surgery.

BIBIOGRAPHY

An Initiative of The Tamil Nadu Dr. M.G.R. Medical University University Journal of Surgery and Surgical Specialties