Original Article

"Is surgery delayed surgery denied?"- How we managed hepatobiliary pancreatic surgeries among Bangladeshi patients during COVID-19 era

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Abstract

Background: *Corona virus disease 2019 (COVID-19) is a disease entity caused by the Severe Acute Respiratory Syndrome coronavirus 2 (SARS COV-2). Although it is not a surgical disease, it significantly influences the management of surgical illness in many ways. Delaying the surgery may be considered as denying the treatment. Authorities all over the world formulated different guidelines and recommendations. Considering current pandemic situation and our patients, we are performing surgeries following our hospital and departmental protocol. Delaying the surgery may negate the treatment and may influence the overall outcome that seem like justice delayed justice denied.*

Methods: *In this prospective observational study, we observed different management approaches to 100 Bangladeshi individuals with hepatobiliary and pancreatic surgical disorders from April 2020 to September 2020, in BIRDEM General Hospital and other hospitals of Dhaka. Patients were thoroughly screened, evaluated and prepared to plan the appropriate management strategy. They were triaged according to presentation and were managed accordingly. Patients consented were only enrolled in this study.*

Results: *The study includes 100 consecutive patients between ages of 21 and 70 years, of them, 77 patients were 4th and 6th decade and only 11 patients (11%) were in 3rd decade of life. Highest 28 patients (28%) were in between 40-49 years and 26 patients in 50-59 years age group. We found 48 patients (48 %) were male and 52 patients (52%) were female. Study showed a slight female predominance and presented at an earlier age than male. The pandemic has created a panic in the society, we were getting less number of patients for HPB*

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surgery in March. Since the end of April 2020 onwards and from July, August and September we have performed 39 surgeries.

Conclusion: *This article is based on real-time experiences of Hepato-biliary-Pancreatic surgery department of BIRDEM General Hospital and BRB hospitals, Dhaka by the same surgical team. Our experience with COVID-19 positive surgical patients is not gratifying. Modern imaging techniques ensure early detection with better understanding of magnitude of disease, which is essential for proper treatment planning.. Both elective and emergency surgeries can be performed safely with proper precautions. Patients with bridging procedures responded well to planed definitive management. Strategies like neoadjuvant therapy and endotherapies for planned definitive surgical care ensures promising results. Postoperative pneumonia in COVID-19 detected patients is a challenging complication. Optimal management strategy requires a multidisciplinary approach for successful outcome.*

Key wards: *surgery in COVID, liver surgery.*

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INTRODUCTION

Throughout the world, health experts are facing unprecedented difficulties in dealing with rapidly evolving and emerging situation the coronavirus disease 2019 (COVID-19) pandemic caused by the novel coronavirus-2 (nCoV-2). [1] The COVID-19, caused by SARS-CoV-2 has escalated rapidly in Bangladesh. Authorities globally, have formulated robust guidelines with the help of local experts. Current guidelines recommended, prioritization of emergency surgical procedures deferring elective and routine surgical cases. This study intended to validate our approaches to liver, biliary tree and pancreatic surgical disorders among Bangladeshi patients during COVID-19 era.

METHODS

We are cautiously monitoring the current COVID-19 pandemic situation in national, regional and international perspective. This prospective observational cohort study was conducted on 100 consecutive Bangladeshi patients, carried out from April to September, 2020 managed by the same surgical team at BIRDEM General Hospital, BRB hospitals Ltd. of Dhaka. Patients who have consented were only enrolled in the study. Standard Operation Protocol was followed ensuring overall safety of patients and fellow colleagues. Apart from Social distancing, crowd avoidance, other theatre etiquettes and techniques we are taking adequate measures to prevent dissemination of COVID-19. Our Hospital is one of the major tertiary care hospitals covering almost all disciplines with specialized care services, especially to diabetic patients. Most patients are enlisted diabetic patients or referred from different districts. Mortality rate in diabetic patients in COVID-19 is four times higher, so separate facilities for COVID-19 detected patients were arranged discouraging mingling of patients. [2] Although principally our hospital is a non-COVID hospital, but we have dealt with suspected as well as COVID-19 detected patients with mild to moderate symptoms and few cases of severe symptoms.

Patient were counseled regarding the plan of management, hospital protocol and on arrival triage before admission. Patients were encouraged to keep out of hospital, to escape unnecessary admission to avoid contact with other patients. It also minimizes the health risks to health care workers and patients. Decision for surgical intervention was made on a daily basis. COVID-19 was pursued in all patients prior to surgery with RT-PCR, to identify infected individuals, sort patients from asymptomatic, minimally/moderately symptomatic, and severely symptomatic individuals. Asymptomatic and minimally/moderately symptomatic could be quarantined to avoid the spread of virus, with severely symptomatic patients were managed and isolated separately. There are many asymptomatic patients who are, nevertheless, shedding virus and are unwittingly exposing others.

Sixty-seven Patients presented with acute surgical illness were prioritized. Along with biochemical investigations, all patients were scheduled for chest X-ray. CT chest was performed in all 17 patients, 10 suspected cases of COVID-19 and 07 patients with respiratory symptoms. Patients were educated regarding on arrival triage before hospitalization and counseled for minimum number of attendants. Attendant Management was a great challenge, a significant barrier to infection control. We prefer minimal hospital stay for both newly admitted and postoperative patients. Patients were thoughtfully reviewed for elective procedures with plan to minimize, postpone, or abandon elective invasive procedures.

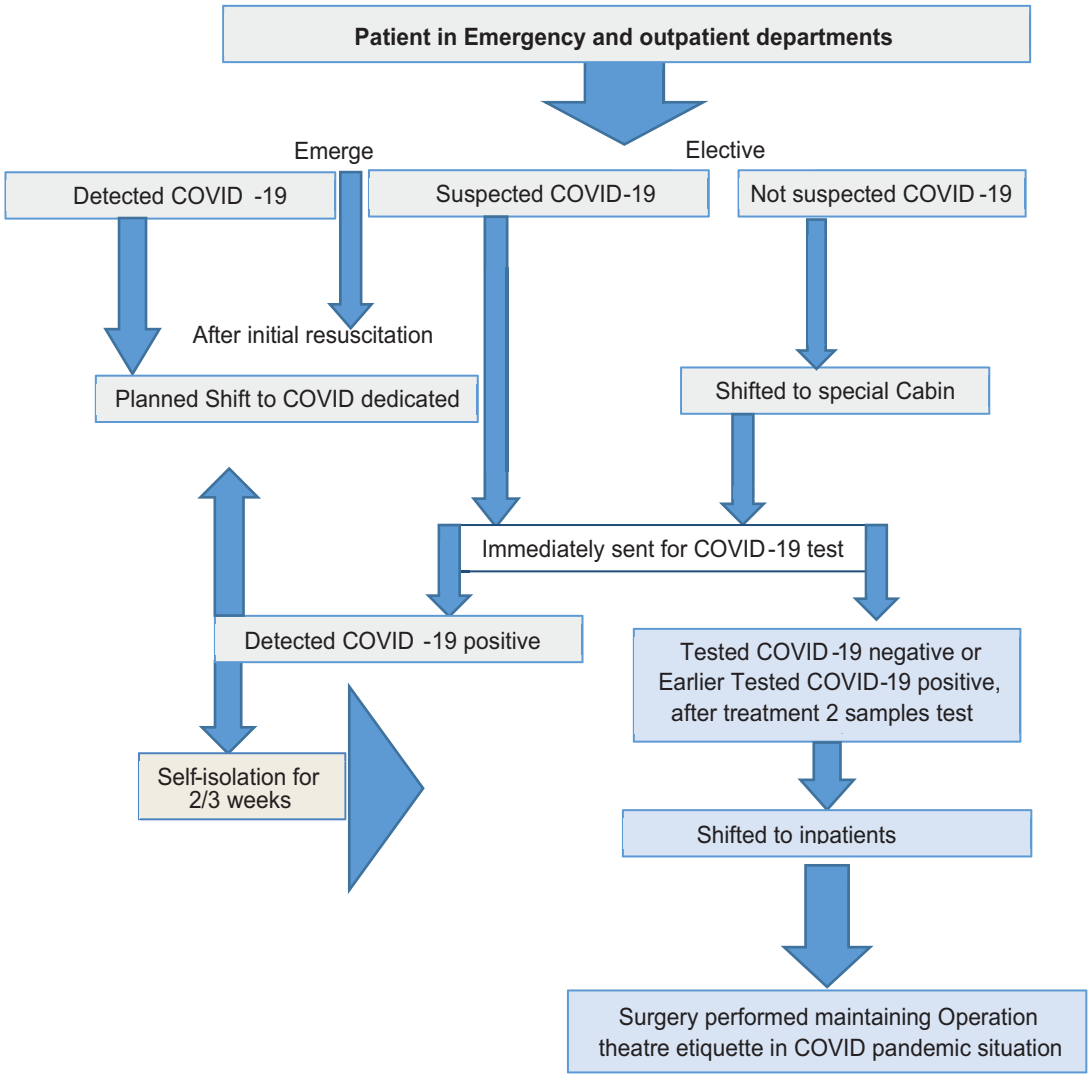

Figure (Flowchart): Patient in Emergency and outpatient department flow chart:

COVID-19 TEST RECOMMENDATIONS AND PATIENT PREPARATIONS

Nasopharyngeal swab COVID-19 RT-PCR tests were performed according to national guidelines. Samples were sent immediately whether suspected COVID-19 or not. SARS–CoV-2 patients typically seroconvert between 6 and 15 days after the onset of illness. Best investigation result can be achieved on day 14 of illness. [2-5] It is not certain that individuals infected with SARS–CoV-2, consequently recovered will be protected. RT-PCR COVID-19 test result was initially considered valid for 7 days. [6, 7] Admitted patients without any history of contact were barred from repetition unless suspected or pre-anesthetic checkup (PACU) protocol. However, at present the investigation done more than 72 hours apart needs repetition. Most patients with COVID-19 can be coped with symptomatic management and self-isolation for two to three weeks or telemedicine. Severe breathlessness or difficulty in breathing, chest pain or pressure, blue lips or face, hemoptysis are the Red flag signs. Negative swab test does NOT rule out COVID-19. D-dimer, ferritin– high values indicate cytokine storm. Chest X-ray or CT chest Sensitivity is around 80% and bilateral, basal, peripheral ground-glass opacities (GGO) with crazy paving is indicative of COVID-19. [2-9]

Planning management strategy

Decision for surgery is more important than incision. Decisions were made on a daily basis and the day before surgery. Managements instead of surgery were preferred to reduce unplanned post- operative critical care management. They were advised planned return for definitive management. Non-operative management was recommended where possible and reasonable (eg. acute cholecystitis). Certain elective surgeries were deferred judiciously for several weeks. 57 Patients were considered conservative management instead of surgery and later planned return for definitive treatment. 17 patients (17%) tested were COVID-19 positive before surgery, they were sent for self-isolation for 10 to 14 days or sent to COVID dedicated facilities. All COVID positive cases patients were treated until tested COVID negative. In our series, 49 cases presented with benign disease and 51 cases with malignant disease. Emergency interventions like ERCP with endobiliary stenting was done in 11 patients as bridging procedure and neoadjuvant therapy to 21 patients. Among the 25 cases of cholecystectomy 18 cases had features of acute cholecystitis not responding to conservative management for at least 72 hours and 07 patients had acute gallstone pancreatitis depending upon clinical parameters and judgments. Laparoscopy was considered only in 25 COVID negative individuals where clinical benefit to patient substantially exceeds the risk of potential viral transmission. Only 03 patients required conversion to open procedure. As it carries risk of aerosol-type formation, considerable caution was taken by filtered release of CO2 and fumes through a water sealed drainage system to avoid aerosol generation.

Individual measures

Protective equipment's with N95/ KN95/ FFP2/3 face mask, disposable polythene or plastic apron and eye/ face protection by goggles/face shields with coverall were used in all Aerosol Generating Procedures (AGPs) with PPE following standard protocols. In ward rounds, use of individualized automated machines for pulse/BP monitoring and pulse oxymeter were preferred. In the operation theatre standard surgical safety measures were followed, a minimum number of staffs with restricted movement between theatres, HDU or surgical ICU facilities were ensured. Theatre stuffs were educated about the safety measures, timely surgical care based on sound surgical judgment with available resources.

Theatre measures

Operating theatres were considered as a high risk zone, where AGPs were performed regularly. Air purifiers with HEPA filters and plasma filters were used in the operation theatres. Minimum number of staffs with appropriate PPE depending on role and risk. General anesthesia is an AGP. High risk patients were intubated and preferably extubated within the theatre. The key event is sterile donning and doffing of PPE.

Follow-up

Postoperatively patients were monitored following guidelines. Findings of observation were recorded on prescribed data collection from. Later editing and analysis was done manually in computer-based software.

RESULTS

Total patients were 100 with slight female predominance (52%). Their age ranged between 16 and 70 years (Table I). Surgeries were performed according to mode of presentation following the protocol. Seventeen patients (17%) tested positive for SARS-CoV-2 before surgery and were sent for self-isolation for 10 to 14 days or COVID dedicated hospitals. Patterns of operation and month-wise distribution of cases are shown in Table I and II respectively. Emergency interventions like ERCP with endobiliary stenting was done in 11 patients as bridging procedure, percutaneous drainage of liver abscess in three patients and neoadjuvant therapy was given to 11 patients of pancreatic malignancy. All COVID-19 detected patients were treated until tested negative in two consecutive samples.

We noticed gallbladder disease in 46 patients, liver disease in 9 patients, biliary disease in 16 patients, duodenal lesion in 2 patients and pancreatic disease in 14 patients. In 17 cases of Whipple partial pancreaticoduodenectomy, we found carcinoma ampulla of Vater in 9 patients, carcinoma head of pancreas in 4 patients, duodenal adenocarcinoma in 2 patients and cholangiocarcinoma in 2 patients. 17 patients who tested were COVID-19 positive before surgery, they were sent for self-isolation or sent to COVID dedicated facilities for bridging procedures responded well. One patient presented with features of obstructive jaundice due to pancreatic head mass on evaluation underwent Whipple's partial pancreaticoduodenectomy later reported lymphoplasmocytic sclerosing cholangitis in histopathological analysis.

Postoperative morbidity was noted in 7 patients with two immediate postoperative 30 days mortality in COVID-19 detected patients due to postoperative pneumonia. One patient had a burst abdomen requiring immediate repair with tension suture. Among other complications, 3 (3%) patients had basal atelectasis and 5 patients (5%) developed paralytic ileus. All patients of HPB malignancy were advised adjuvant chemotherapy.

Table I Patient demographics and diagnosis (*n*=100)

Name of operation	Total cases	Male	Female	Age distribution (years)						
				0-19	20-29	30-39	40-49	50-59	60-69	70-79
Surgery for benign disease										
Cholecystectomy	25	9	16	-	2	1	12	5	5	-
Biliary reconstruction for stricture	8	5	3	-	-	1	1	3	3	-
Choledochal cyst excision	4	3	1	1	-	-	2	1	-	-
Surgery for chronic fibrocalculous pancreatitis	7	4	3	-	4	1	1	1	-	-
Pancreatic necrosectomy with pseudocyst-jejunostomy	2	-	2	—	-	-	2	-	-	-
Left lateral hepatic sectionectomy	2	2	-	—	-	-	-	-	2	-
Haemangioma excision	1	-	1	—	-	-	1	-	-	-
Total benign cases	49	23	26	1	6	3	19	10	10	-
Surgery for malignant disease										
Surgery for carcinoma gallbladder	21	8	13	-	-	2	5	6	6	2
Whipple procedure	17	12	5		1	4	2	6	3	1
Hepatocellular carcinoma resection	5	2	3	-	-	-	1	3	1	
Surgery for cholangiocarcinoma	3	2	1	-	-	-	-	1	1	1
Radical gastrectomy	3	1	2	-	-	1	1	-	1	-
Left lobectomy	1	1	-	-	-	-	-	-	1	-
Solid pseudo papillary tumour	1	1	-		-	1	-	-	-	-
Total malignant cases	51	27	24	-	1	8	9	16	13	4
Total cases	100	48	52	1	7	11	28	26	23	4

Table II Monthly distribution of Surgeries for hepato-biliary- pancreatic disorders (*n*=100)

Name of illness	Total cases	Male	female	Monthly distribution of cases					
				April	May	June	July	August	September
Benign									
Acute calculus cholecystitis	25	9	14	2	1	2	3	10	7
Bile duct stricture	8	4	4	-	1	2	1	3	1
Choledochal cyst	4	3	1	-	1	-	2	1	-
chronic Fibrocalculous pancreatitis	7	3	4	-	-	1	3	2	1
Necrotizing pancreatitis with pseudocyst	2	-	2	-	-	-	-	1	1
Left lateral Sectionectomy	2	2	-	-	-	-	1	1	-
Haemangioma	1	-	1	-	-	-	-	1	-
Total benign cases	49	23	26	2	3	5	10	19	10
Malignant									
Carcinoma GB	21	8	13	1	2	2	7	8	1
Periampullary carcinoma	17	12	5	1	1	2	2	8	3
HCC	5	2	3	-	-	1	1	3	-
Cholangiocarcinoma	3	2	1	-	-	-		2	1
Carcinoma stomach	3	1	2	-	-	-	1	1	1
RPC with Hepatolithiasis	1	1	-	-	-	1	-	-	-
Solid pseudo papillary tumor	1	1	-		-	-	-	-	1
Total malignant cases	51	27	24	2	3	6	11	22	7
Total malignant +benign cases	100	50	50	4	6	11	21	41	17
Nature of surgery									
Elective	41	22	19	-	-	1	6	26	7
Emergency / urgent	59	29	30	4	6	10	15	15	10

DISCUSSION

Novel coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), rapidly spread and worsened resulting global pandemic stretching healthcare systems worldwide to their limits. [10] WHO announced COVID-19 outbreak as a pandemic on 11 March 2020. According to World Health organization (WHO) COVID situation report-39, till November 23, 2020 In Bangladesh, total tested 2665131, confirmed cases 449760 of COVID-19, and recovered 364611 with 6416 deaths. [18] Surgery is a basic pillar of medical care, which results in the following challenges for everyday clinical practice: Prioritization of surgical interventions, Establishment of SARS-CoV-2 and non-SARS-CoV-2 emergency rooms, surgical non-intensive care ward, operating area. Necessary precautions should be taken while using certain surgical devices and techniques. In general, authorities have mandated that non-urgent surgical interventions should be postponed or suspended. [11, 12, 14] On the other hand, emergency surgical care and the surgery of tumor patients and patients with urgent indications should continue. It should be pointed out that it is still entirely unclear when routine operations can resume and whether patients who do not require immediate surgery should be granted priority when needed [15]. Besides, there is possibility of mixing of COVID-19 patients with non COVID-19 patients within the same vertically established hospital complex.

Diabetes Mellitus (DM) is an important co-morbidity in COVID-19 patients and 20-50% of patients in COVID-19 pandemic have diabetes. DM contributed second to cardiovascular disease, 9.2% of case fatality. And with HbA1C e" 6.5% (chronic hyperglycemia) had an in-hospital mortality rate of 29% -50%. Mortality is more than four times higher than patients without diabetes or hyperglycemia (6%). 42% of patients who had no evidence of diabetes prior to being admitted, and developed hyperglycemia during their stay, died in the hospital (acute hyperglycemia). BIRDEM General Hospital is a major tertiary care hospital covering almost all disciplines with specialized care services to all especially the Diabetic patients. Most patients attending our Outpatient department are enlisted diabetic patients or referred from different districts of Bangladesh. As mortality rate in diabetic patients in COVID-19 pandemics is four times higher, we recommend separate facilities for COVID patients [2].

COVID-19 since it's detection as pandemic created panic globally. Since then less number of patients were reporting for HPB surgery except very few emergencies. However, since April we have gradually started surgeries and from July to September we have performed a maximum of 39 cases among the study population. We have found 49 cases of benign disease and 51 cases of malignant disease. Highest 28 patients (28%) in 40-49 years age group (Figure 1) reported in our series with about 48 patients (48 %) male and 52 patients (52%) female. Patients with acute illness were first advised non-operative treatment. Prioritization should take place from both a medical and logistical point of view and therefore requires close coordination between the operational partners in order to continue to ensure adequate perioperative treatment quality [15]. Decisions were made for surgery according to severity of illness and COVID-19 report. CT-scan findings of chest was performed in all patient with COVID-19 symptoms. Among 25 cholecystectomies 18 patients had features of acute cholecystitis not responding to conservative management for at least 72 hours and 07 patients had features of acute gallstone pancreatitis depending upon clinical judgments. Emergency interventions, ERCP with endobiliary stenting was done in 11 patients as bridging procedure and neoadjuvant therapy to 11 patients of pancreatic malignancy.

Minimally invasive surgery is the gold standard of many diseases and, thus, it is crucial to establish and to maintain a pneumoperitoneum increasing the potential risk of exposure to aerosolized viral particles. Therefore, an uncontrolled release of the pneumoperitoneum should be prevented, and filter systems or closed circuits [16]. Only a few reports in the literature relate to the possible risk to the surgical team of inhalation of viruses from patients during a laparoscopy. Virus and bacteria's can be detected in both laparoscopic and open surgical operations. [17] Surgical aspirator or smoke evacuation device should also be used in open procedures. In 1996, Des Coteaux et al. demonstrated the presence of breathable aerosols and cell-size fragments in the cautery smoke produced during laparoscopic procedures. The particle sizes ranged from 0.1 to 25 ìm. [18, 19] Energy devices and electrical instruments should be utilized on the lowest energy level to avoid unnecessary production

of smoke and aerosols. Theoretical risk that pneumoperitoneum gas could carry bacteria in aerosol form and spread infection throughout the peritoneal cavity during laparoscopy for infective conditions. Laparoscopy was considered only in 25 COVID-19 negative individuals and 03 patients required conversion to open procedure. Although it carries risk of aerosol formation, considerable precaution was taken to avoid aerosol generation. The Society of American Gastrointestinal and Endoscopic Surgeons (SAGE) recommends stopping elective surgeries. In urgent or necessary surgeries, since laparoscopy could potentially release viruses, SAGE states that the use of devices to filter released CO2 for aerosolized particles with reduction of medical staff inside operating room, use of personal protective equipment (PPE). [20] We have used controlled release of the pneumoperitoneum through a closed water sealed antiseptic circuit. We have found little evidence of risk in minimal invasive surgery. Moreover, with proven benefits of reduced length of hospital stay and minimal or no complications.

It is interesting to notice that, about 46 patients suffered Gallbladder disease with biliary disease in 16 patients, pancreatic disease in 14 patients and only 9 patients suffered liver disease and duodenal lesion in 02 patients. In about 17 cases of Whipple partial pancreatic oduodenectomy, we found the highest nine patients of carcinoma ampulla of Vater and four patients of carcinoma head of pancreas. In our series during this COVID era, one patient was detected with Lymphoplasmocytic sclerosing cholangitis in histopathological analysis of Whipple's partial pancreaticoduodenectomy specimen.

Safest tactic to avoid SARS-CoV-2 transmission is minimize operation time, damage control surgery in emergency situations and the procedure that is most familiar to the surgical team. Our strategic finding revealed, during the era of COVID-19 all patients requiring surgery needs surveillance with RT-PCR. Both elective and emergency surgeries can be performed safely with proper precautions. Seventeen patients who tested were COVID-19 positive before surgery, they were sent for self-isolation or COVID dedicated facilities for bridging procedures and responded well to planed definitive management. Although, we had seven postoperative morbidity, but two immediate postoperative 30 days mortality due to post COVID pneumonia gives us a very important lesson regarding intricate management postoperative pneumonia during this era of COVID-19.

Limitations of the study

The study has few limitations, conducted with a small sample size and not representative of the whole country or region. More representative findings can be obtained from large sample size and in different tertiary level hospitals. A long time follow up is necessary.

Conclusion

Authorities are facing unprecedented difficulties in dealing with the current COVID-19 crisis. This article is based on real-time experiences from a Hepato-biliary-Pancreatic surgical team COVID 19 positive surgical patients is not gratifying. Early detection of COVID 19 and proper individualized management plan is the key. Modern imaging techniques ensure early detection with better understanding of magnitude of disease. During the era of COVID-19, patients ensuing bridging procedures to plan definitive management is worthwhile. Strategies like Neoadjuvant therapy, endotherapy and minimal invasive procedures are very effective for planned definitive surgical care, circumvent denial to surgery with promising outcome. Postoperative pneumonia in previously COVID-19 detected individual is a challenging complication. Both elective and emergency surgeries can be performed safely with proper precautions. Strategic planning for optimal management requires a multidisciplinary approach for successful outcome. .

Authors' contribution: HR conceived and planned, design and implementation of the research and carried out the experiment and lead writing the manuscript. All authors provided critical feedback and helped in the management, analysis of the results and to the writing of the manuscript.

Conflicts of interest: Nothing to declare.

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