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Mesentric venous thrombosis in COVID 19 patients

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Abstract— Introduction: Patients with coronavirus 19 (COVID 19) presented with mesenteric venous thrombosis (MVT). **Methods:** This study included 10 patientspresented with acute abdomen who were diagnosedwith MVT on contrast enhanced CT of the abdomen. Diagnosis of COVID 19 was confirmed by PCR on nasal and orpharyngeal swab in 8 cases while the other two cases with negative PCR were diagnosed by high resolution chest CT. All cases were managed with abdominal exploration except for one case with splenic infarction which was managed conservatively. All cases received therapeutic dose of low molecular weight heparin postoperatively.

Results: In our study two cases out of nine required re-exploration and re-resection of the gangrenous bowel segment and another two cases require mechanical ventilation because of chest complication.

Conclusion: The best current strategies for confronting such complication in COVID-19 are prophylaxis with low-molecular-weight heparin and treatment with full-dose low-molecular-weight heparin with monitoring of anti-Factor Xa if available; however there is no evidence to support thus result.

Keywords: COVID 19, corona virus and mesenteric venous thrombosis.

Introduction:

COVID-19has become pandemic disease. Most deaths are related to severe acute respiratory distress syndrome, but other organ failures, such as acute kidney failure and acute cardiac injury seem to be also related to the disease.(1)

Thromboembolic complications are being increasingly recognized in COVID 19 pneumonia (2).Apart from deep venous thrombosis and pulmonary embolism (PE), acute mesenteric ischemia (AMI) has been reportedin severe COVID-19 patients. AMI is a devastating complication with high mortality rate so earlyrecognition, and timely treatment is essential to avoid morbidity and mortality associated with this disorder (3).

Patients with severe COVID-19 complicated by AMI maypresent with abdominal pain, nausea/vomiting, diarrhea,abdominal distention or worsening systemic status (sepsis).Blood tests may reveal elevated lactate levels and D-dimer. However, both these tests are non-specificandmaybeelevatedinsevereCOVID-19withoutAMI(4).Imaging has a vital role to play in timely detection of AMIand is the mainstay of diagnosis. Computed tomographyangiography (CTA) is the imaging study of choice to diagnose AMI (5).

Methods:

This is a prospective clinical trial conducted inMinia university hospital and Elrayeelsaleh hospitalover the period between 15 March to 30 June of 2020.This study included10 cases presentedwith acute abdomen. All cases had history of vague symptoms such as mild respiratory symptoms (cough), vomiting, diarrhea, loss of taste and smell and mild abdominal pain.

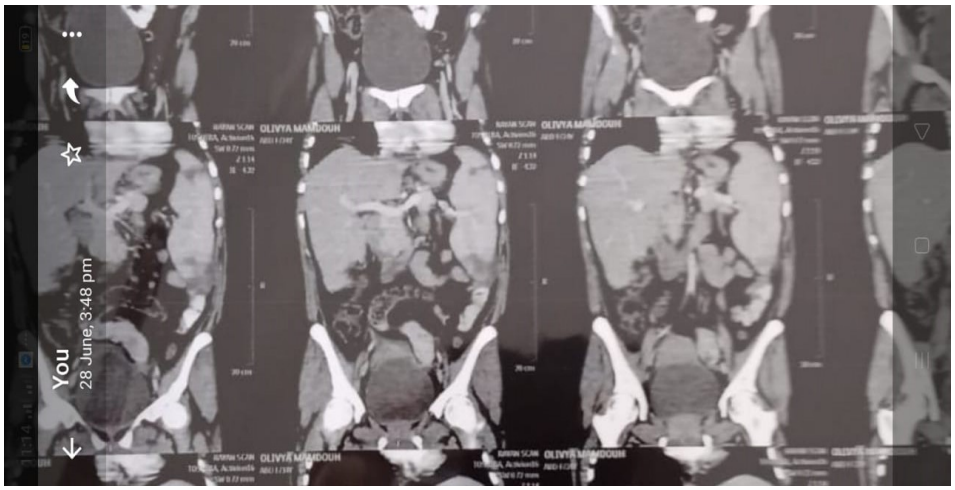
CT abdomen with contrast was performed in all cases which demonstrated finding suggestive of MVO in the form of non-enhancing thick bowels-wall, edematous and dilated bowel (>3cm) which was demonstrated in 5 cases while pneumatosisintestinalis or portal venous gaswas detected in 2cases

or sup mesenteric vein thrombosis in two cases and splenic vein thrombosis with splenic infarction in one case Fig (1)(2)(3).

Routine labs of the cases were suggestive of possible infection with corona virus in the form normal leucocyticcount with absolute lymphopenia in the full blood picture, high serum ferritin and positive D dimer.Confirmation of the diagnosis was done by PCRon nasal and oropharngeal swabs which revealed positive resultsin 8 cases. High resolution CT scan of the chest was done only in the two cases with negative PCR which demonstrated typical ground glass appearance.

All cases were managed with abdominal exploration except for splenic infarction case which was managed conservativelywith full dose anticoagulation and the abdominal pain was improved. Exploration revealed segmental gangrene of the bowel and the gangrenous segments were resected.Postoperatively therapeutic dose of anticoagulation with low molecular weight heparin was given to all patients Fig(4).

Venous duplex of the lower limbs was routinely done in all cases postoperatively which demonstrated deep veins thrombosis in two cases who had a higher level of D dimer on admission than other cases.



Fig(1): CT abd showing infarction of lower lobe of spleen

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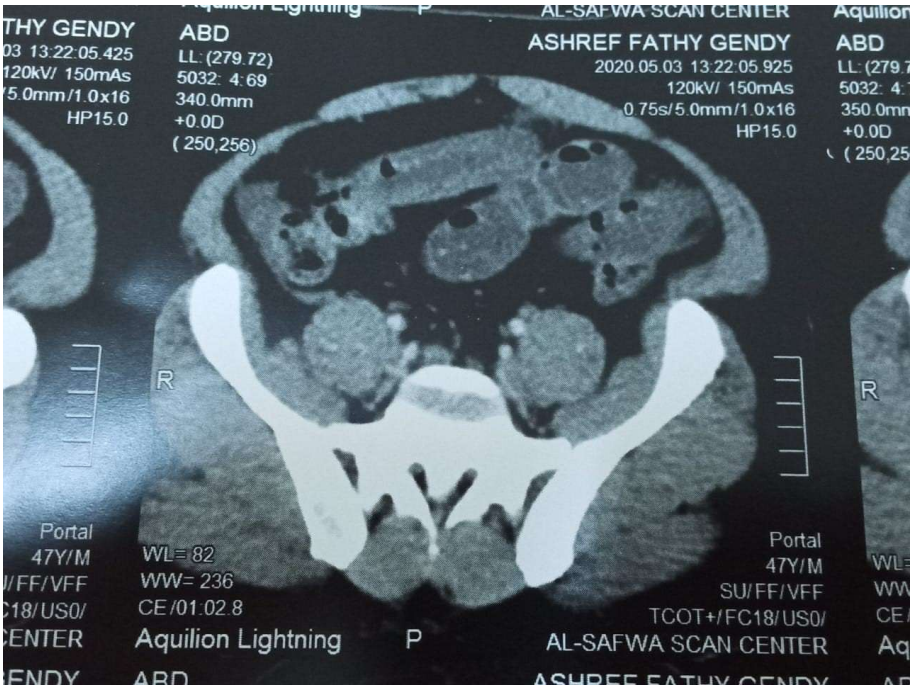
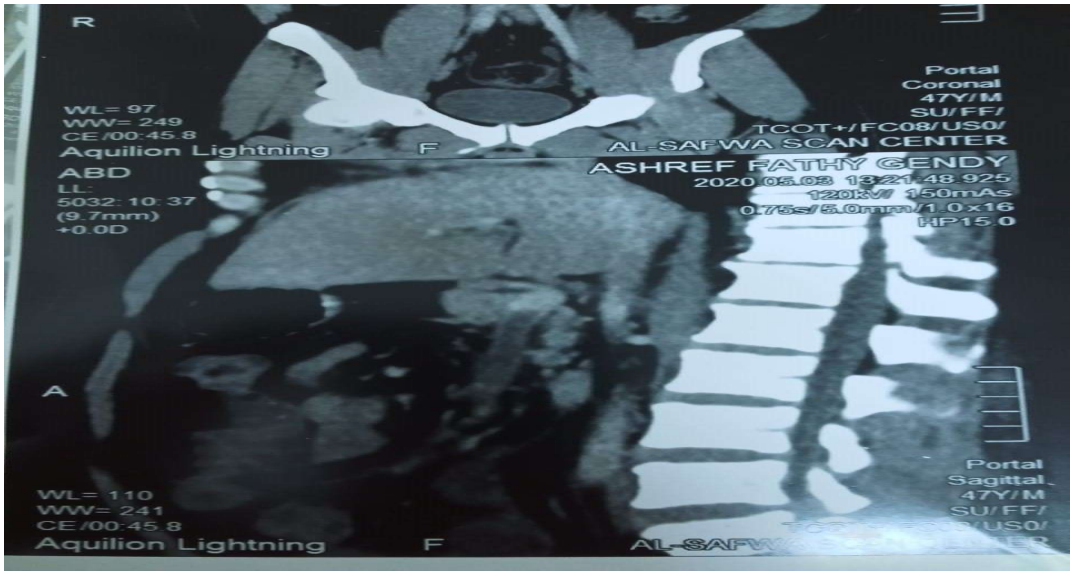


Fig(2): CT abd showing thickened edematous bowel segments



Fig(3):CT with contrast showing thrombus of SMV

Fig(4): Intraoperative image showing gangrenous bowel segment.

Result

Ten patients presented with acute abdomen to Menia University hospital and Elrayeelsaleh hospital over the period between 15 March to 30 June of 2020 with acute abdomen aged 55 ±10 years. Comorbidities included diabetes mellitus (2 patients), hypertension (3 patients), ishemic heart disease (one patient).

Segmental bowel necrosis due to MVT was found in nine cases while splenic infarction was found in one case. All cases received therapeutic anti-coagulation post operatively.On second look exploration after 24 hours re-resection was done in two cases because of extension of the gangrene.All operative cases were admitted to ICU postoperatively and two cases required mechanical because of chest complicationand their condition deteriorated with multiorganfailure and they finally died.

Discussion:

The prevalence of deep venous thrombosis and pulmonary embolism has been documented in hospitalized patients diagnosed with COVID 19 which is associated with increased morbidity and mortality.(6) This has lead to recommendation of full dose anticoagulation in severely ill patient ; however , as yet there is no proof of the effectiveness of this strategy(7).

Early diagnosis of acute mesenteric ischemia in COVID 19 patients is crucial to avoid morbidity associated with this serious complication. High index of suspicion is required due to lack of the physical findings. Patients with labs finding suggestive of Corona virus infection with unexplained abdominal pain should raise the suspicion. Diagnosis should be confirmed by CT abdomen with contrast.

Although the exact mechanism of such complication is unknown possible causes may include hypercoagulability associated with systemic inflammatory syndrome, elevated level of von Willebrand factor as aresult of endothelial injury caused by virus particles, shock and hemodynamic compromise.(8)these causes have implemented that the use of drugs targeting the macrophage or IL6 and inhibit the complement pathway may have arole in management of COVID 19 patients with a little evidence. (9)(10)

Kaafaraniet al reported two cases diagnosed with COVID to have extensive bowel necrosis and Biancoet al reported the same complication in their series (11)(12).

There are several limitations in this study as this it is limited number of patients and a relatively short duration of follow up however the continuing work in the department will cover these limitations and a bigger number of the patients will be treated and evaluated by a longer follow up.

Conclusion:

The best current strategies for confronting such complication in COVID-19 are prophylaxis with low-molecular-weight heparin and treatment with full-dose low-molecular-weight heparin with monitoring of anti-Factor Xa. There is no strong evidence regarding the pathogenesis of the coagulant effect of COVID-19 to guide therapy. Further randomized control trials are needed to help guide management of COVID 19 patients.

Reference

[1] Yang, X., Yu, Y., Xu, J., Shu, H., Liu, H., Wu, Y., ... & Wang, Y. (2020). Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. The Lancet Respiratory Medicine

[2] Lodigiani, C., Iapichino, G., Carenzo, L., Cecconi, M., Ferrazzi, P., Sebastian, T., ... & Sandri, M. T. (2020). Venous and arterial thromboembolic complications in COVID-19 patients admitted to an academic hospital in Milan, Italy. Thrombosis research.

[3] Bhayana, R., Som, A., Li, M. D., Carey, D. E., Anderson, M. A., Blake, M. A., ... &Kilcoyne, A. (2020). Abdominal imaging findings in COVID-19: preliminary observations. Radiology, 201908.

[4] Klok, F. A., Kruip, M. J. H. A., Van der Meer, N. J. M., Arbous, M. S., Gommers, D. A. M. P. J., Kant, K. M., ... &Endeman, H. (2020). Incidence of thrombotic complications in critically ill ICU patients with COVID-19. Thrombosis research

[5] Fitzpatrick, L. A., Rivers-Bowerman, M. D., Thipphavong, S., Clarke, S. E., Rowe, J. A., & Costa, A. F. (2020). Pearls, Pitfalls, and Conditions that Mimic Mesenteric Ischemia at CT. RadioGraphics, 40(2), 545-561.

[6] Klok, F. A., Kruip, M. J. H. A., Van der Meer, N. J. M., Arbous, M. S., Gommers, D. A. M. P. J., Kant, K. M., ... &Endeman, H. (2020). Incidence of thrombotic complications in critically ill ICU patients with COVID-19. Thrombosis research.

[7] Khan, I. H., Savarimuthu, S., Leung, M., &Harky, A. (2020). The need to manage the risk of thromboembolism in COVID-19 patients. Journal of vascular surgery, S0741-5214(20)31157-5. Advance online publication. https://doi.org/10.1016/j.jvs.2020.05.015

[8] Parry, A. H., Wani, A. H., &Yaseen, M. (2020). Acute mesenteric ischemia in severe coronavirus-19 (COVID-19): possible mechanisms and diagnostic pathway. Academic Radiology.

[9] Cavalli, G., De Luca, G., Campochiaro, C., Della-Torre, E., Ripa, M., Canetti, D., ... &Tomelleri, A. (2020). Interleukin-1 blockade with high-dose anakinra in patients with COVID-19, acute respiratory distress syndrome, and hyperinflammation: a retrospective cohort study. The Lancet Rheumatology

[10] Maglakelidze, N., Manto, K. M., & Craig, T. J. (2020). A Review: Does Complement or the Contact System Have a Role in Protection or Pathogenesis of COVID-19?. Pulmonary therapy, 1–8. Advance online publication. https://doi.org/10.1007/s41030-020-00118-5

[11] Kaafarani, H. M., El Moheb, M., Hwabejire, J. O., Naar, L., Christensen, M. A., Breen, K., ... &Mokhtari, A. (2020). Gastrointestinal complications in critically ill patients with COVID-19. Annals of Surgery.

[12] Bianco, F., Ranieri, A. J., Paterniti, G., Pata, F., & Gallo, G. (2020). Acute intestinal ischemia in a patient with COVID-19. Techniques in Coloproctology, 1.