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Journal of Pediatric Surgery Case Reports 61 (2020) 101604

Contents lists available at ScienceDirect

Journal of Pediatric Surgery Case Reports

journal homepage: http://www.elsevier.com/locate/epsc

Intestinal ischemia secondary to Covid-19

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ARTICLE INFO

Keywords:
SARS-Cov 2
Kawasaki like
Intestinal ischemia
Medullar aplasia

ABSTRACT

With the wide spread of the current SARS-Cov (Covid-19), It was found that about 2% of children was affected according to several studies, it should be mentioned that Those children are most often asymptomatic, but the current concern is about a vascular inflammatory disease which is similar to Kawasaki disease observed in children with Covid-19.

we report a case of a 9-year-old girl, known to have idiopathic medullar aplasia, admitted to the emergency department for a pseudo appendicular syndrome with shock, neurological abnormalities and skin lesions. She underwent an emergency surgery; the peroperative exploration suggested an ischemic bowel lesion of the ileal loop and a healthy appendix. The link involving a Covid-19 infection was well established (RT-PCR +).

We shared in common our clinical, radiological, biological and pathological data to draw attention towards the intestinal vasculitis that can be a part in the MIS-C related to Covid 19. To our best knowledge, this is the first case encountered of combination between Covid-19 with intestinal ischemic in children.

1. Introduction

All the way through the spread of the Covid-19 pandemic; the number of children affected has not gone beyond 2% according to several publications (1). throughout the pandemic, authors have reported the appearance of a multi-organ inflammatory syndrome (MIS-C: multisystem inflammatory syndrome in children), which is similar to Kawasaki disease (1,3,4,5,6).

The causal relation with Covid-19 is well confirmed, suggesting an intense immune reaction that occurs late due to a primary viral infection that went unnoticed. The main noticed manifestations are high fever, vasoplegic shock, neurological disorders and almost constant digestive disorders. but right now none of the authors has reported the case of an intestinal ischemia in children.

We report a case of an Algerian girl underwent an emergency surgery for a pseudo appendicular syndrome associated with multisystemic impairment (MIS-C) in an immunosuppressed child.

2. Case description

It's all about a case of a 09-year-old-girl with a medical history of idiopathic medullar aplasia diagnosed at the age of 3 and was on corticosteroids for one year (5 mg/day, 1day out of 2 on alternate days) who was examined at the surgical emergency department for a febrile pain of the right iliac fossa which was appeared one day before. It was accompanied by vomiting and diarrhea. Clinical examination of the child determined that the patient was scored 15 based on Glasgow score, the weight was 50 kg (BMI 26.6) with a temperature of 40°c. The abdomen examination findings determined tenderness of the right iliac fossa.

Laboratory findings were as follows: WBC:1140/µL. HGB:7g/dl. Platelet: 4000 µL. CRP:240mg/l.

The abdominal-pelvic ultrasound findings monitored a swollen appendix with a densification of the mesenteric fat with a transonor liquid of medium abundance.

The first decision was considered, to correct and fix the hematological disorders and to combine antibiotics and analgesics.

By the end of the transfusion, the child developed a shock: greyish complexion, sinus tachycardia (180 beats/minute), hypotension (60/34

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https://doi.org/10.1016/j.epsc.2020.101604
Received 8 July 2020; Received in revised form 8 August 2020; Accepted 10 August 2020
Available online 20 August 2020

Abbreviation

SARS-Cov 2	severe acute respiratory syndrome coronavirus 2
MIS-C	multisystem inflammatory syndrome in children
RT-PCR	reverse transcriptase-polymerase chain reaction
CPK	creative phosphokinase
CRP	protein C reactive

Fig. 1. Skin lesions.

mm hg), an oxygen saturation of 100%, temperature of 39°. She demonstrated hallucinations, confusion, as well as the appearance of an ecchymosis closet like skin lesions on the right lower limb (Fig. 1) and an accentuation of the abdominal pain.

Laboratory findings were as follows: WBC 820/μL. HGB: 6 g/L. platelet: 45,000/μL. prothrombin: 48%. Blood glucose: 1.2g/l. Urea: 0.45g/l; creatinine 09 mg/l. Natremia: 130 mmol/l, kalemia: 3 mmom/l.

Blood gaz: PH: 7.46. PCO2. 25.9 mm hg. PO2: 121.1 mm hg. Hco2:18.3mmol/L

A transfusion shock having been eliminated; after the stabilization of the child 's condition The radiological examinations found the same images that were determined by the abdominal ultrasound.

Fig. 3. Ileal ischemia.

Fig. 2. Thoracic CT-scan showed a ground glass opacities in left lung, thickening and, pleural effusion of small abundance.

Fig. 4. Healthy appendix.

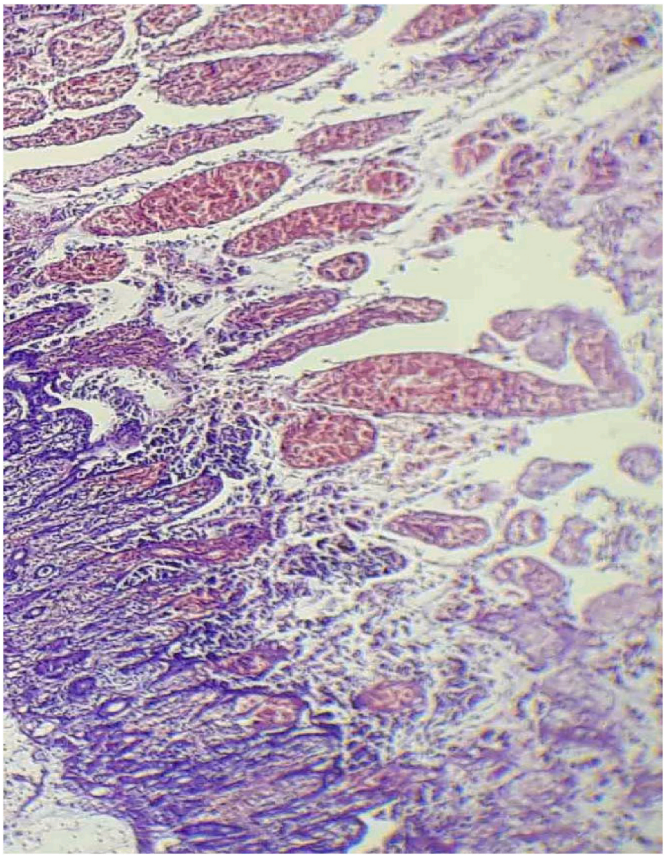

Fig. 5. HEx 100: grelic wall with ischemic necrosis.

Both Chest X-ray and thoracic CT-scan showed suggested a ground glass opacities in left lung, pleural effusion of small abundance (Fig. 2). A brain CT scan: was normal

And thus we ended up with an acute appendicular syndrome with shock, neurological signs, skin lesions, respiratory alkalosis and lung lesions. The MIS-C syndrome related to the Covid-19 viral Infection has been evoked on a medullary aplasia.

On account of the worsening of the child's condition and the accentuation of abdominal pain, the operative decision was performed.

Via right para-median incision, the exploration finds a sero-thematic liquid of average abundance, ischemic ileal lesions on 25 cm–20 cm from the ileocecal crossroads (Fig. 3) and a healthy meso-coeliac appendix (Fig. 4)

Resection of the ischemic loop with double ileostomy is performed.

Post operatively, immunoglobulins then corticoids are administered according to a treatment guideline in addition to antibiotics (cephalosporins + metronidazole + aminosides + azithromycin).

The cyto-bacteriological study of the peritoneal fluid was 100% lymphocytic.

The RT-PCR of the nasopharyngeal swab was positive.

As a matter of fact pathology demonstrated an hemorrhagic infarction lesions with foci of ischemic necrosis without evidence of thrombus (Fig. 5).

The patient was extubated two days after, The Skin lesions had completely disappeared, intestinal transit resumed with functional ileostomy but the patient demonstrated persistence of the same neurological and cardiac disorders with tension peaks went from (150/70 to 240/120 mmhg) and severe pancytopenia.

On the fourth day, the metabolic assessment was very disturbed: besides hepatic cytolysis, renal failure, albumin was: 20 mg/l, CRP 419 mg/l, CPK: 7852 IU/L, D-dimer 13 mg/l, fibrinogen: 5, 48 g/L. troponin 0,023 ng/ml.

On the seventh day: there were an onset of tachypnea with increased oxygen requirements (>10L), requiring respiratory assistance. The patient died on the tenth postoperative day.

3. Discussion

The number of children affected by Covid 19 is about 2% among the general population (2% in the UK. 1.7% of the population in the USA, 1% in the Netherlands [1].

The symptomatology is most often benign (45.5%), the moderate form makes up around 41.5%, while the severe: 4.4%. The critical form 0.9%, the deaths are rare (3 cases), according to a series published by Xiaojian Cui of 2596 children [2].

The digestive disorders related to direct involvement of the virus are rare: diarrhea 6.6%, vomiting 5.8% [2].

All through this pandemic, a multi-systemic inflammatory syndrome (MIS-C) was reported for the first time by jones VG (USA) on April 7, 2020: a 6-month-old infant with Kawasaki disease related to a positive Covid-19 test [3]. Since then, other cases have been reported related to covid-19 and suggesting a post-viral immune response.

On May 06th, 2020: Righagen (UK) [4] reported a serie of 8 cases of MIS-C.

On May 13th, 2020: Verdoni (Italy) [5] published a serie of 10 cases (PCR +: 20%, serology IgG +: 80%).

May 14th, 2020 Toubiana (france) [6]: 17 cases (PCR +: 41% and serology IgG +: 88%)

And on May 17th, 2020 an alert is issued by the New York State Department of Health Identifying more than 100 cases of MIS-C associated to Covid 19 [7,8].

The clinical data was most often intense with fever for over 4 days, with constant vasoplegic shock. 55% of patients required the administration of vasoactive drugs, digestive signs are in the foreground (83%); we noticed also cardiac damage on echocardiography (69%), neurological signs: headaches, irritability, confusion and meningeal irritation

Table 1
Clinical, imaging and laboratory features of differents studies of syndrome MIS-C associated to covid 19.

SERIES	Jones et al (USA)	Riphagen et al. (UK)	Verdoni et al. (Italy)	Toubiana et al. (France)	Total	our case Algeria
Number of cases	1	8	10	17	36	1
Age	0.5	8.4	7.5	7.5	7 .5	9 ans
SEX/Female	1	3	3	10	47%	1 F
Obesity/overweight	_	2		3	13,8%	overweight
Immuno depression	0	0	0	0	0%	YES
Clinical features						
FEVER > 4 day	1	8	10	–	100%	<24H
Shock with inotropes treatment	0	8	2	10	55%	NO
Gastrointestinal Symptoms	NO	7	6	17	83%	YES
Neurological features	1	2	4	16	61%	YES
Skin lesions	1	4	-	13	69%	YES
Imageries abnormalities						
Chest X-ray or CT abnormalities	1	4	5	6	44%	YES
Echocardiography abnormal	0	7	6	12	69%	_
Biological features						
CRP moy (mg/L)	133	moy 303 (169–556)	moy 250 (90–525)	moy 219 (89–363)	243 (89–556)	Yes (240–419)
Albumin moy (mg/L)	28	22	32	20	24	YES 20
D –dimere moy (mg/l)	NO	10 .38 (3.4–24.5)	3.798	4. 76 (0.3–19.3)	5.76	YES 13
CPK (IU/L)	_	_	85 (16–247)	_	85	YES 7852
Procalcitonine ng/ml	_	30,55	_	23,3 (0,1–488)	25,61	_
Fibrinogen	_	_	6,21 (3139,24)	-	6,21	YES 5,48

(61%), skin lesions went up to 69%, chest imaging were noticed in within 44%. An intense inflammatory syndrome with an average: CRP was 243 g/L (89–556), Hypoalbuminemia: 24g/l and D-dimers 5.76g/l as shown in Table 1.

Acute abdomen and the pseudo appendicular syndrome was reported by Toubiana:

Three cases in which one of them under abdominal surgery reveling an aseptic peritonitis.

Our patient presents similar symptoms to the cases described with fever, multi organ involvement, intense inflammatory syndrome, intestinal ischemia and a positive screening test of Covid 19.

Our observation is the first case reported with such ischemic lesions complicating the MIS-C syndrome and thus reinforcing the hypothesis of intestinal vasculitis.

An abdominal CT angio-scan would be useful to carry out a lesion assessment, to visualize a possible thrombus and to discuss a medical treatment, our patient had advanced lesions of ischemia and necrosis sites that's why the surgical excision was necessary; Despite the management of the different disorders that appeared; the evolution was fatal in a multi visceral failure.

Medullar aplasia with severe thrombocytopenia is an immunosuppressive condition which is a risk factor for morbidity and mortality; immunosuppressed patients do not present an increased risk of developing a severe form of Covid 19 disease: indeed, Zachariah and al reported among 50 patients hospitalized in New York for Covid 19 disease, eight children with known immunodepression (included solid organ transplant recipients 2, hematologic malignancy 2, those with solid tumors 2, hematopoietic stem cell transplant recipients 1, aplastic anemia 1). only one case developed a severe form of the disease [9] but its association with MIS-C has not been reported: 0 cases.

Our patient had some particularities; the length of time between the first signs and the state of shock is short (24 hours) as well as the intensity of the clinical symptoms and multivisceral impairment.

Is medullar aplasia an aggravating factor of MIS-C associated to Covid 19?

4. Conclusion

The digestive disorders and the pseudo appendicular symptoms are almost constant and at the forefront in the MIS-C associated with Covid 19, thereby it would be recommending that while we have atypical pain syndrome during this pandemic to realize:

* A complete clinical examination for multi-systemic involvements.
* An RT-PCR
* An abdominal CT angio-scan to look for vascular damages in order to establish an appropriate medical treatment (immunoglobulins, corticoids) and thus prevent digestive complications.

Funding

No funding or grant support.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

I would like to express my deep gratitude to Nassima CHABANI, Radjaa AROUS and Ahmed BENSADEK for their encouragement and help to realize this publication.

References

[1] Viner Russell M, Whittaker Elizabeth. Kawasaki-like disease: emerging complication during the COVID19 pandemic lancet. 2020 May 13. https://doi.org/10.1016/S0140-6736(20)31129-6.
[2] Xiaojian Cui. Tongqiang Zhang Jiafeng Zheng Jiayi Zhang Ping Si Yongsheng Xu Wei Guo Zihui Liu Wenliang Li Jia Ma Cuicui Dong Yongming Shen Chunquan Cai

Sijia He. Children with coronavirus disease 2019 (COVID-19): a review of demographic, clinical, laboratory and imaging features in 2,597 Pediatric Patients First published: 17 May 2020 .https://doi.org/10.1002/jmv.26023.

[3] Jones VG, Mills M, Suarez D, et al. COVID-19 and Kawasaki disease: novel virus and novel case. Hosp Pediatr 2020. https://doi.org/10.1542/hpeds.2020-0123.

[4] Riphagen Shelley, Gomez Xabier, Gonzalez-Martinez Carmen, Wilkinson Nick. Paraskevi theocharis hype[r] inflammatory shock in children during COVID-19 pandemic lancet. 2020. https://doi.org/10.1016/S0140-6736(20)31094-1.

[5] Lucio Verdoni , Angelo Mazza , Annalisa Gervasoni , Laura Martelli , Maurizio Ruggeri , Ma[t]teo Ciuffreda , Ezio Bonanomi , Lore[n]zo D'Antiga. An outbreak of severe kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study. doi: 10.1016/S0140-6736(20)31103-X.

[6] Julie Toubiana, Clément Poirault, Alice Corsia, Fanny Bajolle, Jacques Fourgeaud, François Angoulvant, Agathe Debray, Romain Basmaci, Elodie Salvador, Sandra Biscardi, Pierre Frange, Martin Chalumeau, Jean-Laurent Casanova, Jérémie F. Cohen and Slimane Allali Outbreak of Kawasaki disease in children during Covid-19 pandemic medRxiv preprint doi: https://doi.org/10.1101/2020.05.10.20097394. posted May 14, 2020.

[7] US Centers for Disease Control and Prevention Health Alert Network. Multisystem inflammatory syndrome in children (MIS-C) associated with coronavirus disease 2019 (COVID-19). Accessed may 17, 2020. https://emergency.cdc.gov/han/2020/han00432.asp.

[8] Newland Jason G, Bryant Kristina A. Children in the Eye of the Pandemic Storm-Lessons from New York City Eprinte JAMA Pediatrics3; 2020. Published online June.

[9] Zachariah P, Johnson CL, Halabi KC, et al. Pediatric COVID-19 Management Group. Epidemiology, clinical features, and disease severity in patients with coronavirus disease 2019 (COVID-19) in a children's hospital in NewYork City, NewYork. JAMA Pediatr 2020;3. https://doi.org/10.1001/jamapediatrics.2020.2430. Published online June.