

# **COVID-19 and Myositis: CASE REPORTS**

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# PATHOLOGY:

## Findings

COVID-19 is associated with a viral myositis attributable to direct myocyte invasion or induction of an immune response. COVID-19-induced myositis may be varied in presentation, from typical dermatomyositis, myolysis, and a paraspinal affliction with back pain. It may or may not present with acute elevations of enzyme markers such as creatine kinase (CK). Virus-mediated muscle damage is attributed to ACE2 (angiotensin-converting enzyme) receptor-mediated direct entry into muscle fibers, leading on to innate and adaptive immune activation. A greater recognition of the similarity between anti-MDA5-positive myositis with COVID-19 has thrown researchers into exploration — finding common etiopathogenic basis as well as therapeutic strategies. For previously established myositis, chronic care was disrupted during the pandemic with several logistic challenges leading to high flare rates. Teleconsultation bridged the gap while ushering in patient-led care with the digital transition to tools of remote disease assessment.

Alongside the typical respiratory manifestations like cough, fever, and sore throat, proximal muscle weakness is increasingly being reported as a manifestation causing significant morbidity in occasional COVID-19 patients. Myalgia is reported extensively in the literature as a common musculoskeletal manifestation of COVID-19 infection, presenting in nearly half of all COVID-19-infected patients. COVID-19-related myositis and consequently rhabdomyolysis are other reported manifestations, albeit relatively rare [7, 8]. By July 2020, a single case of COVID-19-related myositis had been reported in the literature [9]. Since then, several case reports and series reporting a virus-induced myositis attributed to COVID-19 disease have been published. The muscle involvement may vary from an asymptomatic elevation of CK to severe rhabdomyolysis.

### Acute Viral Myositis

Nearly 23 patient cases of myositis attributable to COVID-19 have been described so far. COVID-19-induced myositis may vary in presentation, ranging from frank muscle weakness to typical dermatomyositis replete with classic rashes, or mere back pain with muscle disease on MRI. Most patients test positive for COVID-19 on initial presentation with most reported being males aged 33–87. Noteworthy, COVID-19 may or may not present with acute exponential elevations of enzyme markers such as CK, and muscle enzymes may not necessarily have a direct bearing on prognosis.

### Rhabdomyolysis

Rhabdomyolysis is one of the rare and severe complications of COVID-19 infection which can be an initial presentation in some cases [10, 11]. In such cases, patients present with typical COVID-19 symptoms such as fever, cough, myalgia, and shortness of breath as well as manifest acute lower limb-dominant symmetric muscle weakness and subsequently go on to develop rhabdomyolysis associated with elevated CK levels. A study reported a peak CK value as high as 33,000 U/L [12]. In this setting, they may present with frank muscle weakness, which is profound, proximal, lower limb-dominant, acute, and symmetric. At times, the patients are critically ill and requiring ventilatory support. The only manifestation of rhabdomyolysis in these may be myoglobinuria (dark urine) and acute kidney injury (AKI) needing hemodialysis with raised CK >5000 IU/L [13, 14, 15]. Rhabdomyolysis can be fatal, with casualties reported in nearly 45% (4 of 9 reported) of those with this presentation over a short follow-up duration (Table 1). Among all reported cases (n = 23) of COVID-19-related myositis so far, 21.7% (n = 5) succumbed to the illness of which 80% (n=4) had rhabdomyolysis.



CÔNG TY TNHH Y HÒA HẢO - PHÒNG KHÁM ĐA KHOA  
(Tên cũ: TRUNG TÂM CHẨN ĐOÁN Y KHOA - MEDIC)  
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<http://medichh.nhsoft.vn>  
Hoặc app: Medic Hoa Hao

**PHIẾU KHÁM BỆNH**  
KHOA SÀNG LỌC COVID 19 - PHÒNG: 1

Năm sinh: 2001 - Nam  
ĐT: [REDACTED]  
Số thẻ BHYT: [REDACTED]

19/72; Mạch: 149; Nhiệt độ: 36.9 °C; Chiều cao: cm; Cân nặng: kg;  
h: F0 16/8 TEST NHANH, CÁCH LY TẠI NHÀ  
e: KHÔNG SỐT, KHÔNG HO, KHÔNG ĐAU HỌNG, KHÔNG MẤT MÙI - VỊ, SpO2 99% / KHÍ  
AU MÔNG P LAN CHÂN P/ XN NHANH THEO LUỒNG XANH MEDIC DƯƠNG TÍNH  
TÂM SOÁT PCR SARS - COV2 TRƯỚC KHI KHÁM VÀ CHỤP MRI

Loại 1

TIỀN: [REDACTED]  
Giờ: [REDACTED] Người lấy mẫu: [REDACTED]

XÉT NGHIỆM: 1

Loại 3 (Khám +)

NG: Dùng ứng dụng mobile banking quét QRCode để thanh toán: (Số HD: 52176, Số tiền: 1,000,000)

Ngày 14 tháng 09 năm 2021 - 09:04  
Bác sĩ  
THS. BS. LÊ ĐÌNH VINH PHÚC

Chức PCR sẽ chụp MRI CSTL (An lực kỳ BS Đại)

Chẩn đoán: MRI CSTL  
BS. Lê Hoàng Vũ

## ➤ 1ST CASE:

- A 20-year-old male patient, visited Hoa Hao on Sep 14<sup>th</sup>
- CHIEF COMPLAINT:
- On August 16<sup>th</sup>: The patient got covid from a housemate due to a quick test at home. Self-isolated and treated at home with mild symptoms.
- On September 3<sup>rd</sup>, the patient had right back pain spreading to the right buttock, went to a private doctor and was given medicine but the symptoms did not decrease.
- On September 10<sup>th</sup>, the patient went to hospital for traumatology and orthopaedics, did the following tests and treatment, but the symptoms did not decrease.
- On September 14, the patient was assigned to the Medic center for an MRI.



SỞ Y TẾ TP HCM  
BV CHẨN THƯƠNG CHÍNH HÌNH  
929 TRẦN HƯNG ĐẠO-P1-Q5  
Tel: 028-39235821

Số bệnh án: CH210901785  
Số bệnh phẩm: 100921-5862

## PHIẾU KẾT QUẢ XÉT NGHIỆM

Họ tên: [REDACTED] Năm sinh: 2001 Giới tính: Nam  
Địa chỉ: [REDACTED]  
BS chỉ định: Khoa: Viện Phổi Ngoại Giờ  
Chẩn đoán:  
Ngày giờ nhận mẫu: 10/09/2021 10:31:36 Ngày giờ in KQ: 10/09/2021 11:04:18  
Loại yêu cầu: Mẫu thường Loại mẫu: Mẫu máu Tình trạng mẫu: Đạt

Yêu cầu xét nghiệm	Kết quả	Giá trị tham chiếu	Đơn vị	Tên máy	Mã PPXN
Huyết học					
Tổng phân tích tế bào máu ngoại vi bằng máy đếm laser					
WBC	8.3	(5 - 10)	X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
NEU%	72.5	(41 - 74)	%	Sysmex XN10	QTKT.HH.01
LYM%	16.5	(21 - 50)	%	Sysmex XN10	QTKT.HH.01
MONO%	9.4	(3 - 9)	%	Sysmex XN10	QTKT.HH.01
EOS%	1.6	(0 - 8.4)	%	Sysmex XN10	QTKT.HH.01
BASO%	0.0	(0 - 1.5)	%	Sysmex XN10	QTKT.HH.01
NEU#	6.0		X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
LYM#	1.4		X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
MONO#	0.8		X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
EOS#	0.1		X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
BASO#	0.0		X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
RBC	4.88	Nữ(3.9-5.4);Nam(4.3-5.8)	X10 <sup>12</sup> /L	Sysmex XN10	QTKT.HH.01
HGB	13.4	Nữ(12.5-14.2);Nam(14-16)	g/dL	Sysmex XN10	QTKT.HH.01
HCT	41.7	Nữ(35-47);Nam(38-50)	%	Sysmex XN10	QTKT.HH.01
MCV	85.5	Nữ(83-91);Nam(84-92)	fL	Sysmex XN10	QTKT.HH.01
MCH	27.5	Nữ(27-31);Nam(28-32)	Pg	Sysmex XN10	QTKT.HH.01
MCHC	32.1	Nữ(32-35);Nam(32-36)	g/dL	Sysmex XN10	QTKT.HH.01
RDW	13.4	(9 - 15)	%	Sysmex XN10	QTKT.HH.01
PLT	245.0	(150 - 400)	X10 <sup>9</sup> /L	Sysmex XN10	QTKT.HH.01
MPV	9.2	(6.5-11)	fL	Sysmex XN10	QTKT.HH.01
Máu lắng (máy tự động)					
ESR	120	(2 - 30)	mm/h	Roller 20	QTKT.HH.03
Sinh hoá					
Glucose	6.25	(3.9 - 6.4)	mmol/L	AU680	QTKT.HS.01
Creatinine	87	Nữ(44-100);Nam(62-120)	µmol/L	AU680	QTKT.HS.03
Uric Acid	385	Nữ(150-360);Nam(180-420)	µmol/L	AU680	QTKT.HS.04
AST (SGOT)	35.6	Nữ (< 31);Nam (< 37)	U/L	AU680	QTKT.HS.05
ALT (SGPT)	69.1	Nữ (< 31);Nam (< 40)	U/L	AU680	QTKT.HS.06
Miễn dịch					
RF	2.2	< 10	U/ml	AU680	QTKT.HS.21
CRP	134.2	< 6	mg/l	AU680	QTKT.HS.20

Ghi chú:

### Thời gian trả kết quả:

- 60 Phút cho các xét nghiệm thường qui (Sinh hóa, Huyết học...)
- 120 Phút cho các xét nghiệm thường qui + miễn dịch.

Địa chỉ: Ấp Bình Châu Xã Tuyên Bình, Huyện Vĩnh Hưng, Long An  
Chẩn đoán: **viêm khớp cứng chậu Phải**  
Hướng xử trí: Xương Chậu thẳng(Chụp Xquang số hóa 1 phim)(1);  
Thuốc:

- Celecoxib ( Celofirm 200 ) 28 Viên  
Ngày uống 2 lần, mỗi lần 1 Viên(sau ăn)
- Pregabalin 75mg ( Prezel 75 ) 28 Viên  
Ngày uống 2 lần, mỗi lần 1 Viên(sau ăn)
- Cefdinir 300mg ( Topdinir 300 ) 28 Viên  
Ngày uống 2 lần, mỗi lần 1 Viên(sau ăn)
- Tramadol 37.5mg+paracetamol 325mg ( Paratramol ) 28 viên  
Ngày uống 2 lần, mỗi lần 1 viên(sau ăn)
- Bromelain 50 F.I.P units ( Bromanase ) 42 viên  
Ngày uống 2 lần, mỗi lần 1 viên(sau ăn)



Dữ liệu xét nghiệm:

Ngày 14/09/2021 (Đã đủ kết quả)

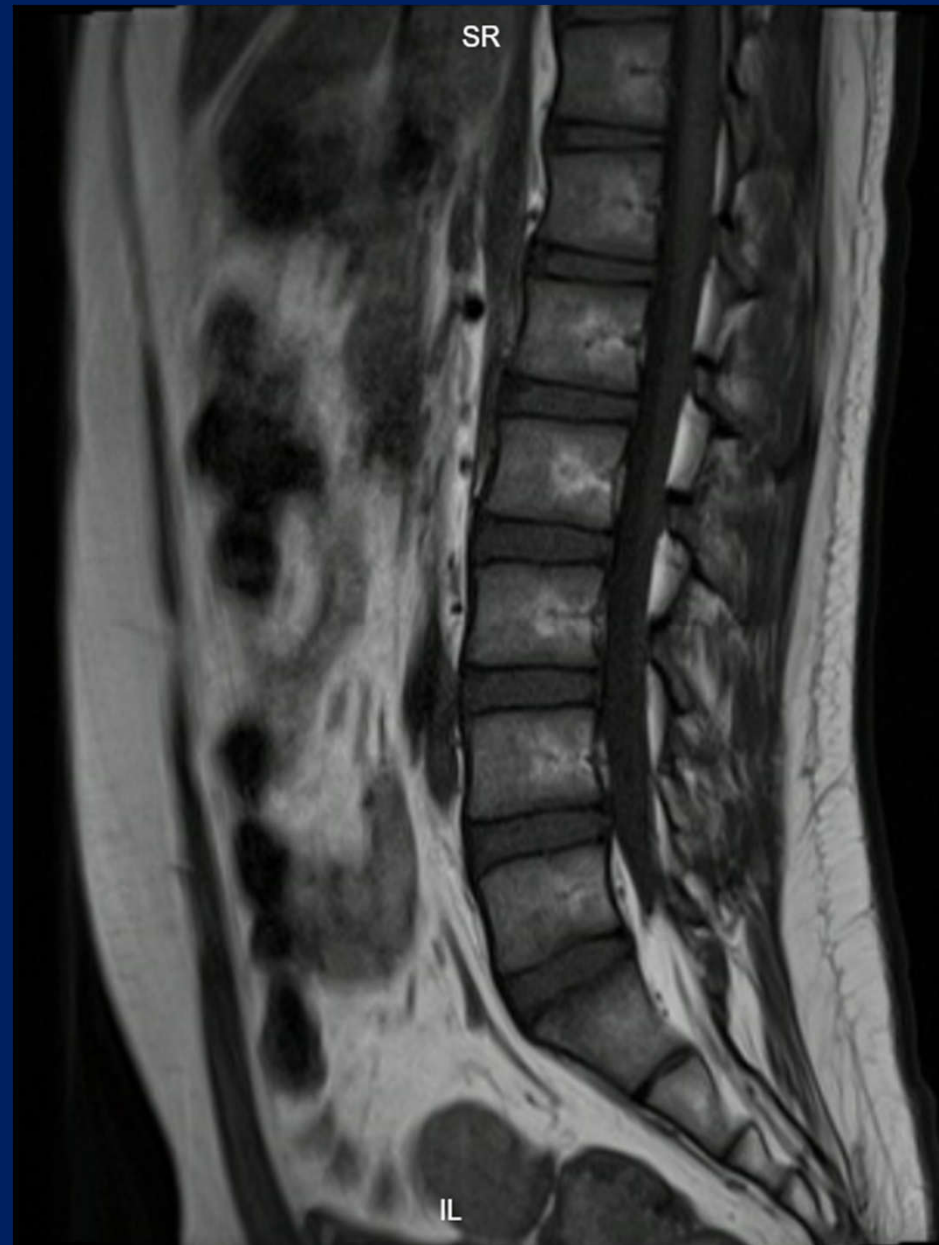
TÊN XÉT NGHIỆM	KẾT QUẢ	KHOẢNG THAM CHIẾU	MÃ QT
I. MIỄN DỊCH - IMMUNOLOGY			
XN nhanh kháng nguyên SARS CoV-2	Dương tính test nhanh	ÂM TÍNH	
( Dịch tỵ hầu )	Chờ kết quả khẳng định RT PCR		
II. SINH HỌC PHÂN TỬ - MOLECULAR BIOLOGY			
Realtime PCR SARS-CoV-2 (mẫu đơn)	<u>Dương tính H</u>	ÂM TÍNH	QTAD351
	Ct 30		

Đóng

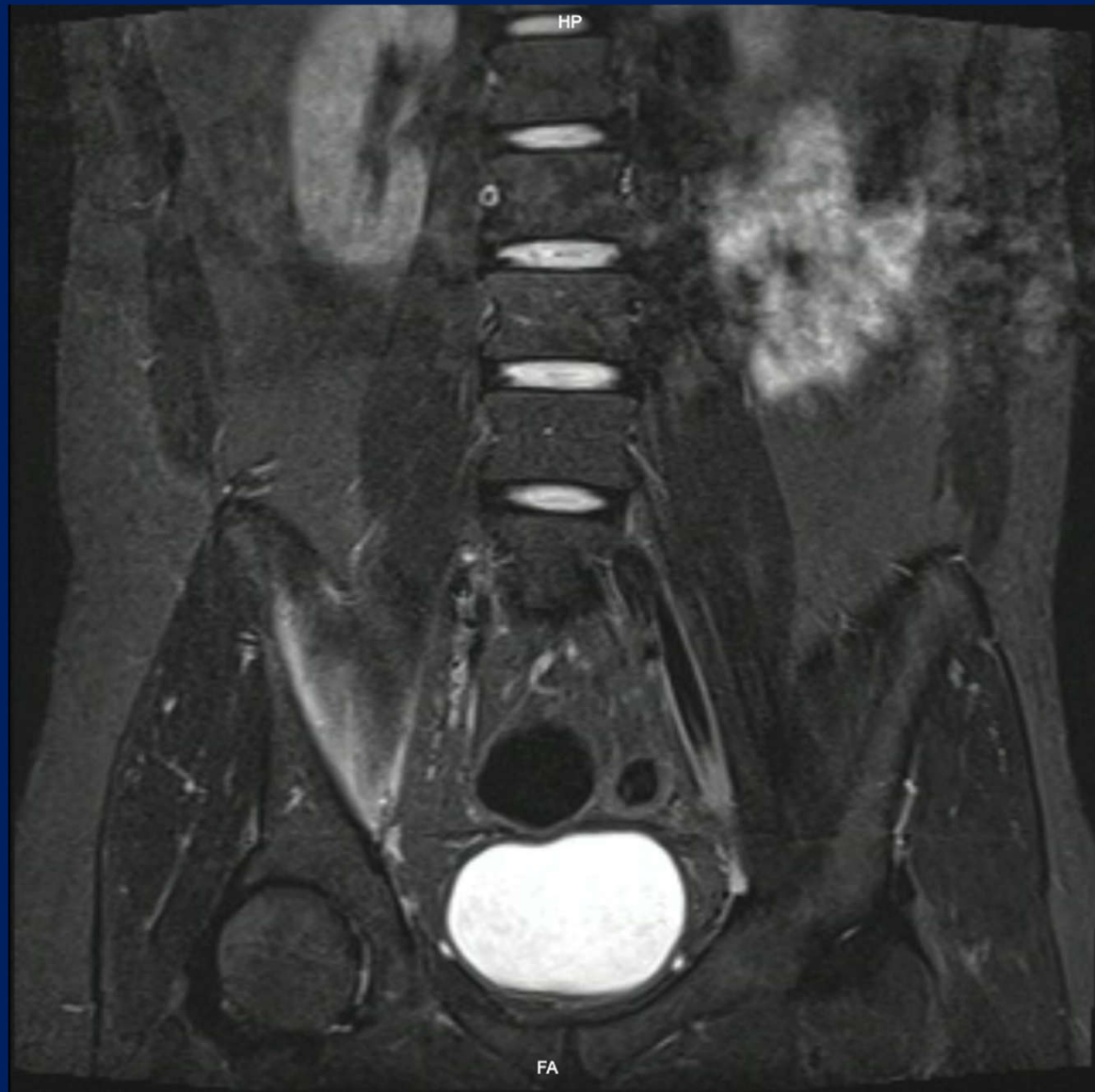
## T2WI SAGITTAL



## T1WI SAGITTAL



# T2WI FATSAT CORONAL





## T2WI FATSAT AXIAL



A



P

**Bệnh viện** : MEDIC **Khoa** : PK

**LÝ DO KHÁM** : đau lưng

**Máy** : SIEMEN ESSENZA 2

**Vùng** : MRI Cột Sống Thắt Lưng

**Không tiêm tương phản**

**Kết quả** : Cột sống thắt lưng được khảo sát qua các mặt cắt theo những chuỗi xung:  
Sagittal T1WI.

Sagittal, Axial, Coronal T2WI.

Không tiêm thuốc tương phản.

**\*\*\* MÔ TẢ:**

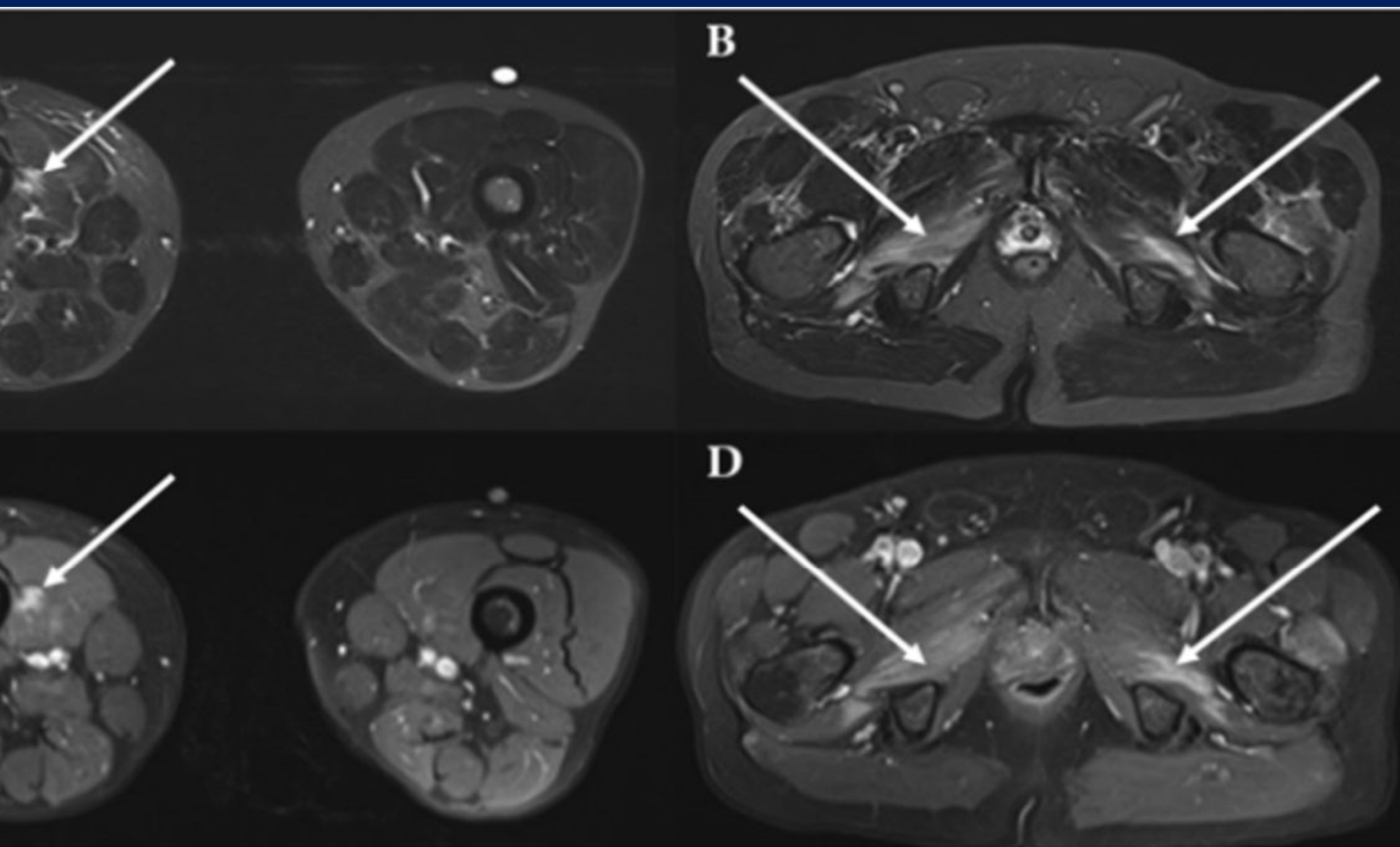
- Không giảm tín hiệu đĩa đệm trên T2WI. Không giảm chiều cao thân sống và đĩa đệm.
- Không ghi nhận lồi hay thoát vị đĩa đệm.
- Đường kính trước sau đo ngang chân cung không hẹp.
- Không hẹp lỗ liên hợp hai bên.
- Không dây hay vôi hóa dây chằng vàng và dọc sau.
- Tủy sống ngực thấp, chóp cùng và các rễ chùm đuôi ngựa bình thường.
- Không thấy u trong túi cùng màng cứng.
- Viêm khớp cùng chậu phải và cơ cạnh sống vùng thắt lưng phải.

**\*\*\* KẾT LUẬN:**

- Không thấy thương tổn thân sống đĩa đệm cột sống thắt lưng.
- Viêm khớp cùng chậu phải và cơ cạnh sống vùng thắt lưng phải.

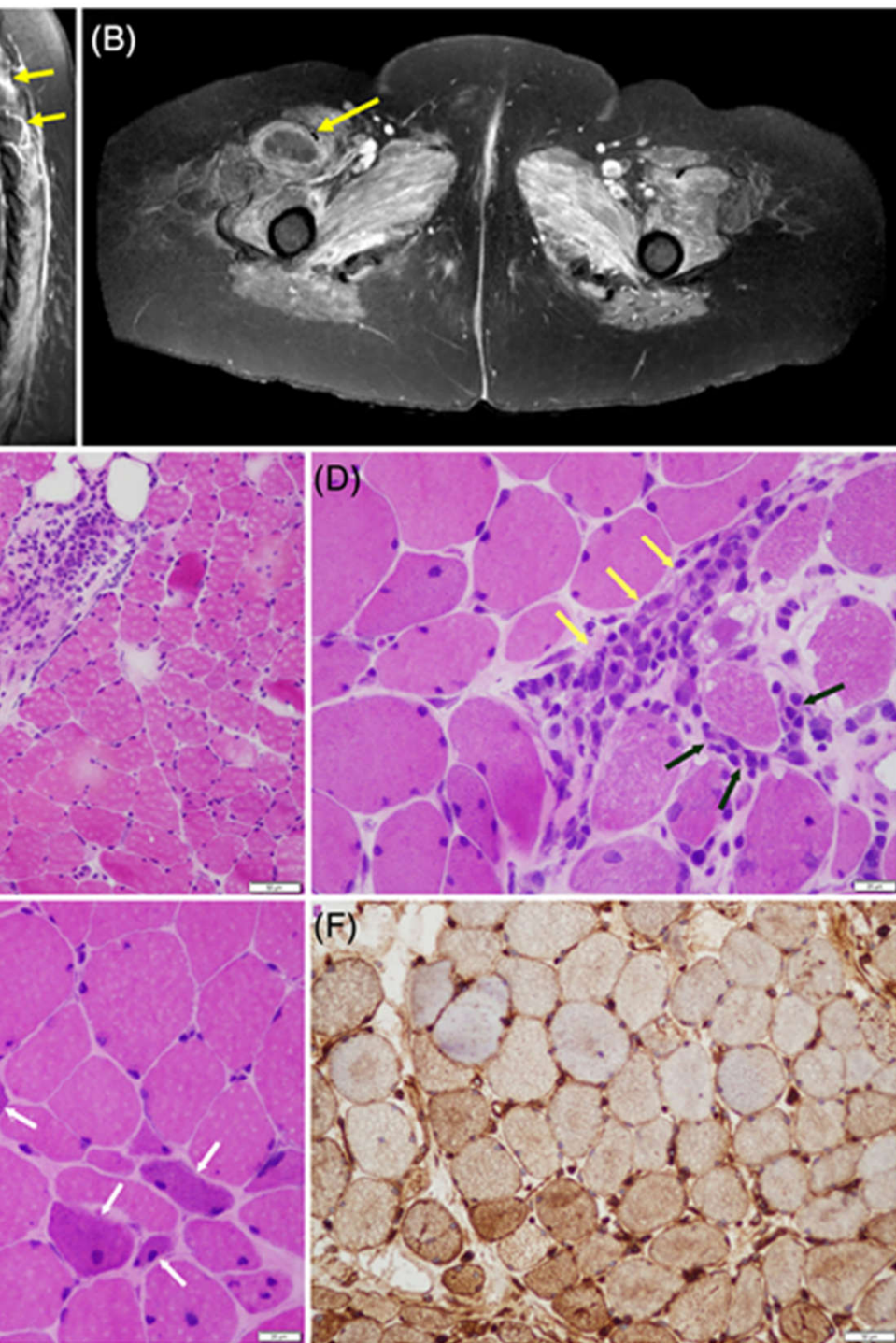
*Tp. Hồ Chí Minh, ngày 14/09/2021 17:16*





Symptoms suddenly on with diffuse and proximal limb weakness, him to fall. C at the hosp patient was and did not any upper airway sympt

and thigh MRI. (A) Thigh MRI in T2 STIR sequence showing oedema of the right vastus medialis (arrow). (B) Pelvic MRI in T2 STIR (short T1 inversion recovery) sequence showing bilateral oedema of external obturator foramina (arrows). (C and D) T1 sequences revealing enhancement of muscle lesions after gadolinium infusion.



A 58-year-old woman presented with cough, dyspnea, and myalgia. Vital signs were normal and her physical examination was unremarkable. Initial polymerase chain reaction testing for SARS-CoV-2 was negative and the patient was discharged home. She returned 2 weeks later with more severe dyspnea, cough, dysarthria, dysphagia, odynophagia, and severe generalized weakness with inability to ambulate. She had no sensory symptoms, bowel or bladder dysfunction.

Physical examination was significant for tachycardia at 110 beats/min and oxygen saturation of 88% on room air. She had bilateral ptosis, facial weakness, hypernasal dysarthria, and profound symmetric proximal limb weakness. Reflexes were symmetrically diminished. Repeat SARS-CoV-2 PCR test was positive.

MRI of the entire neuroaxis showed no central or peripheral nervous system involvement, but it did demonstrate diffuse muscle edema and enhancement, with a region of myonecrosis (Figure 1A,B).

A and B, Sagittal T1WIs of contrast-enhanced fat-suppressed MRI of the paraspinal and thigh muscles demonstrate extensive edema and enhancement (yellow arrows in A) consistent with inflammatory myopathy; central nonenhancement in the vastus medialis (yellow arrow in B) is consistent with myonecrosis. C-F, Biopsy of the left quadriceps muscle. Hematoxylin-and-eosin cryostat sections demonstrate multifocal, predominantly perimysial perivascular lymphocytic inflammation (yellow arrows in D), with focal endomysial extension (black arrows in D). Multiple regenerating myofibers (white arrows in E) are recognized by their mild sarcoplasmic basophilia and enlargement of visible nuclei. Upregulation of HLA class ABC on myofiber surfaces, and sarcoplasmic staining by immunohistochemistry can be identified by the brown staining of myofibers, most consistent with an inflammatory myopathy. Scale bar = 50  $\mu$ m. HLA, human leukocyte antigen; T1WI, T1-weighted image

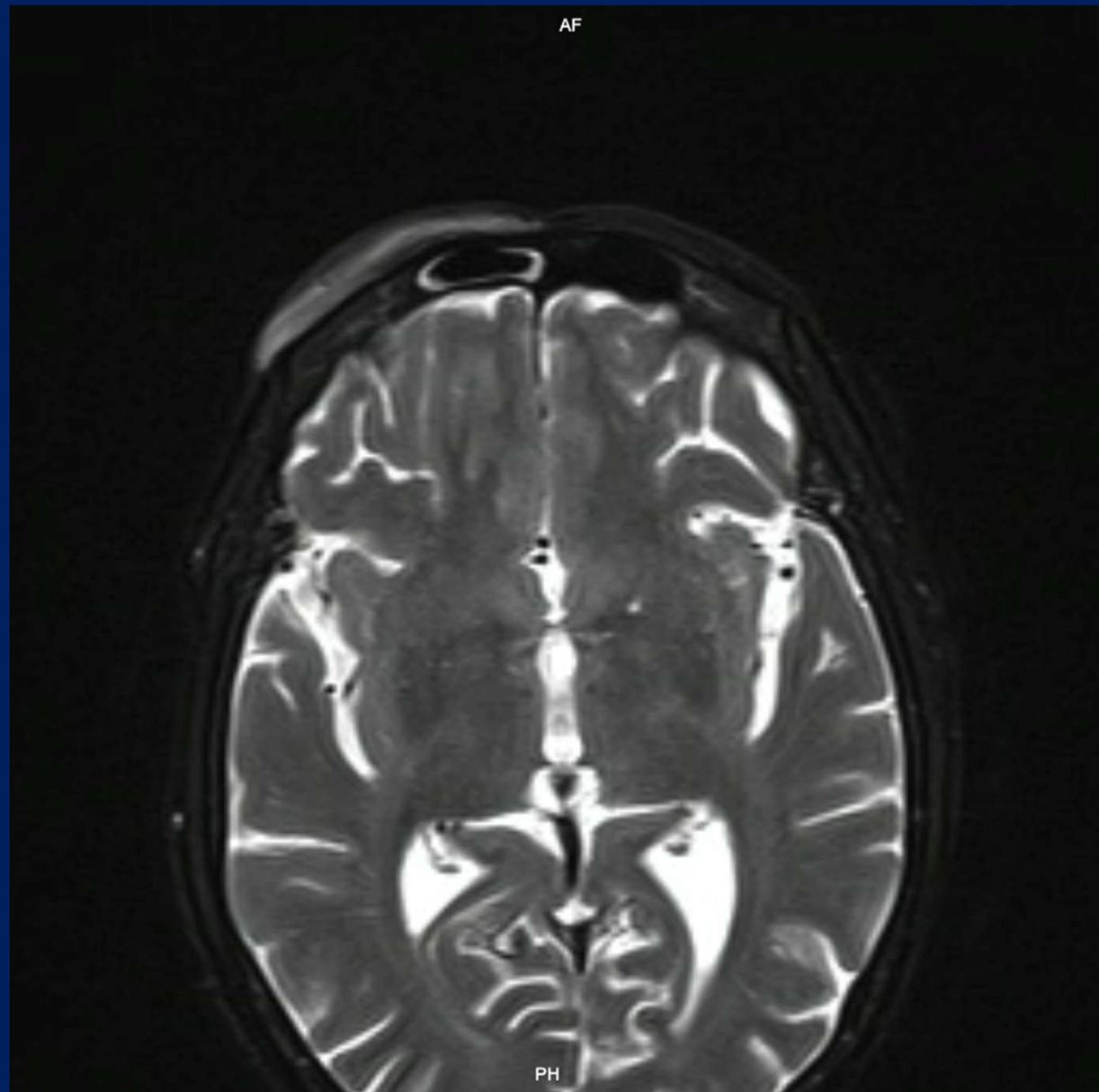


## ➤ 2ND CASE:

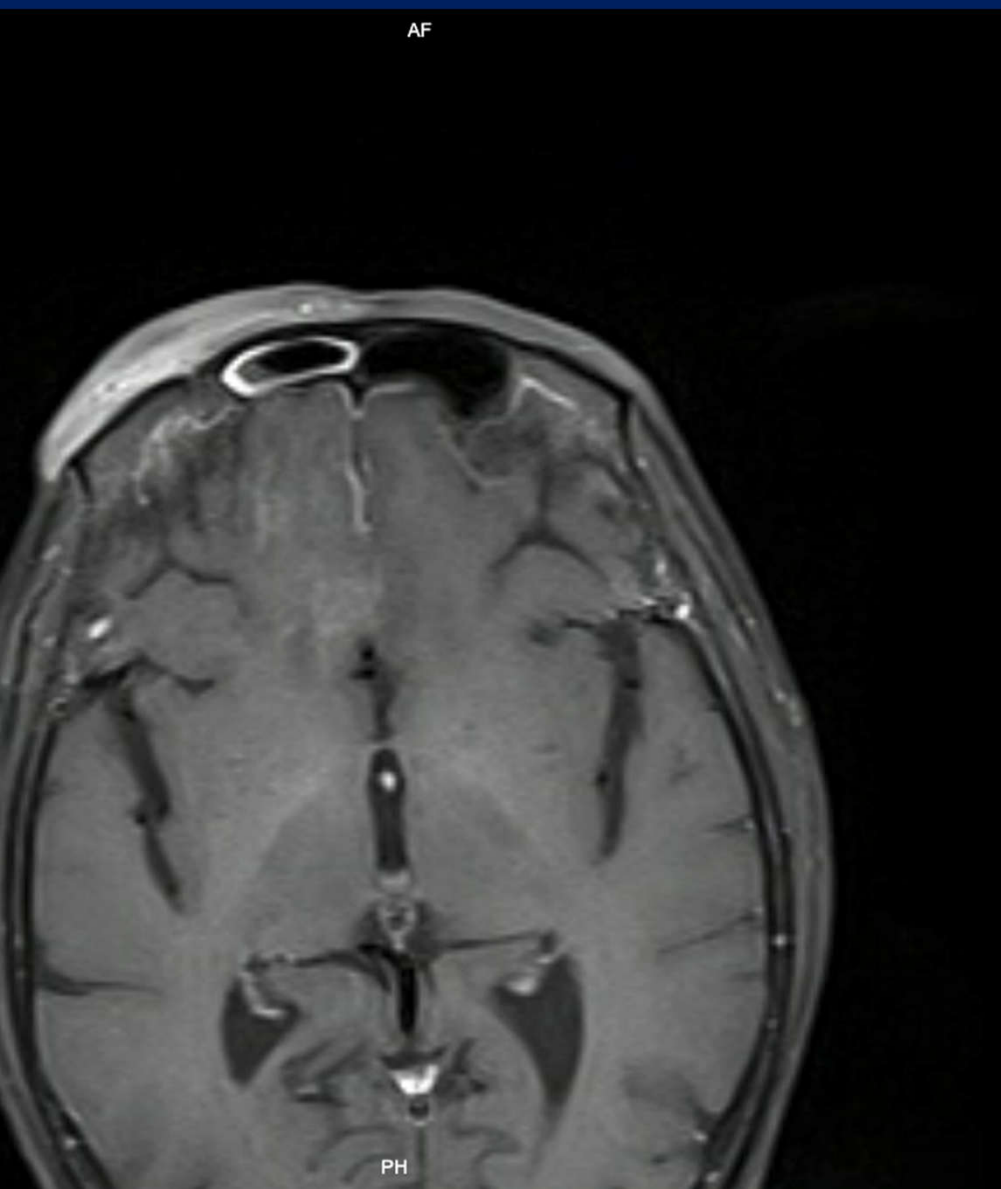
- CHIEF COMPLAINT: The patient had pain in the right forehead and eye for abt 2 days, went to Cho Ray hospital, was diagnosed with sinusitis and given medicine.
- Almost 1 week later, the patient's right eye was red, swollen and painful, with a slight fever, the patient went to Eye Hospital and was assigned to have an MRI at Medic center
- MEDICAL HISTORY:
  - Had Covid self-treatment at home with oxygen support, within 22 days, recovered more than 1 week ago.
  - Diabetes, Hepatitis for more than 10 years.



# T2 DIXON



# GADOVIST



**LÝ DO KHÁM**

: viêm tổ chức hốc mắt

**Máy**

: SIEMEN ESSENZA 2

**Vùng**

: MRI SỌ NÃO \_ HỐC MẮT

**Không, sau đó tiêm tương phản**

**Kết quả**

: Mắt và sọ não được khảo sát cộng hưởng từ có tiêm thuốc tương phản với thông số kỹ thuật: Axial fat sat NE+CE-T1GRE, T2WI; sagittal T1WI; coronal CE-T1WI; axial Flair T2WI

**XOANG**

Dày niêm mạc xoang trán, hàm phải, sàng, bướm hai bên. Vòm hầu và các khoang cạnh hầu bên phải trái đều trống. Các tế bào chùm hai bên không viêm. Không tín hiệu bất thường xoang hang

**MẮT**

Thương tổn dạng thâm nhiễm lan tỏa mô dưới da vùng trán hai bên - thái dương phải, giác mạc mắt p cơ thẳng ngoài và cơ thẳng trên phải. Dày màng não trán hai bên.

Nhãn cầu trái có kích thước, hình dạng và tín hiệu bình thường trên các chuỗi xung khảo sát, không t bong vồng mạc.

Không thấy tín hiệu viêm thần kinh thị.

**SỌ NÃO**

Tầng trên lều và dưới lều không thấy khối choán chỗ, không xuất huyết hoặc tụ máu cũ. Không thấy b lý chất trắng. Các não thất bình thường. Rãnh vỏ não bình thường. Không thương tổn tuyến yên, khôn thương tổn vùng giao thoa thị giác.

**\*\*\* KẾT LUẬN:**

Thương tổn dạng thâm nhiễm lan tỏa mô dưới da vùng trán hai bên - thái dương phải, giác mạc mắt p cơ thẳng ngoài và cơ thẳng trên phải nghi do Viêm. Theo dõi viêm màng não trán hai bên.

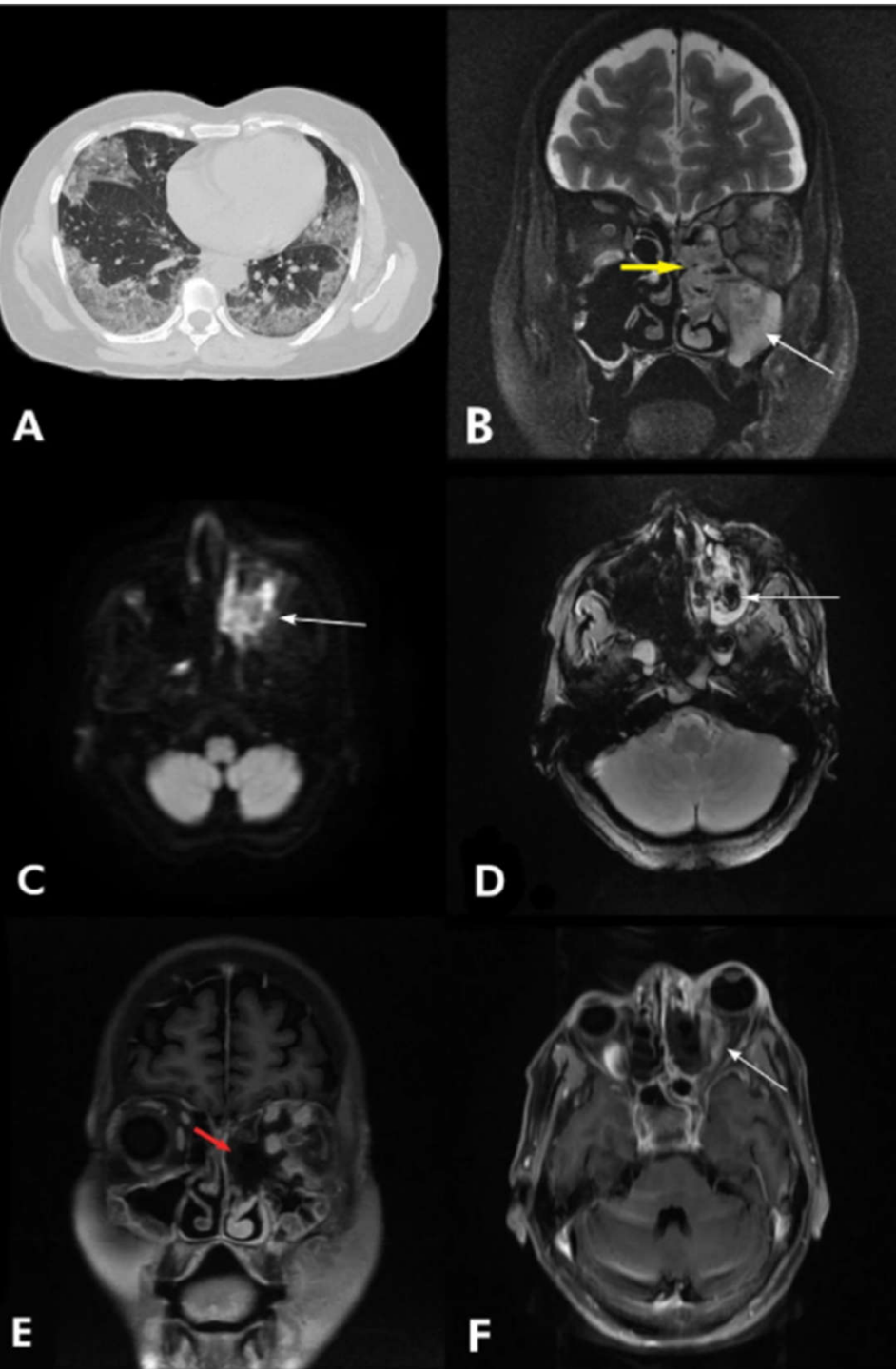
Không khối choán chỗ nội sọ. Không thấy thương tổn nhu mô não.

Viêm đa xoang.

***Tp. Hồ Chí Minh, ngày 14/09/2021 10:49***

***(Bác sĩ đã ký)***





**a** Axial HRCT thorax image showing ground-glass opacities in subpleural regions of bilateral lung parenchyma with “crazy paving appearance.” **b** Coronal T2 FS image showing mucosal thickening and collection in the left maxillary sinus (white arrow), left ethmoid sinus, and left middle nasal turbinate (yellow arrow). **c** Axial DWI image showing restricted diffusion in the left maxillary sinus and middle nasal turbinate. **d** Axial GRE image showing blooming in the left maxillary sinus (white arrow). **e** Coronal T1 post-contrast image showing non-enhancing soft tissue in left middle nasal turbinate and within the left maxillary antrum (“black tumor sign”). **f** Axial T1 post-contrast image showing enhancement and inflammation involving extraocular muscles of left orbit causing proptosis.



A 44-year-old male tested positive for SARS-CoV19 after experiencing back pain and fever to 100.3. He complained of sinus congestion but had no purulent nasal discharge. His past medical history was significant for an idiopathic facial palsy which occurred spontaneously, resolved completely, and had no additional workup or neuroimaging and a neurogenic tumor removed from his spine in 1995 with no recurrence. Two days after his COVID-19 diagnosis, the patient noted swelling of the left eyelids and started rubbing while sitting in a hot tub. Over the next 24 hours, he developed proptosis and periorbital edema with discomfort. He was treated in an outpatient urgent care clinic with a 3 day course of oral prednisone and corticosteroids with improvement in his symptoms. However, upon steroid cessation, his eyelid swelling recurred and he was started on a course of oral cefazolin. His swelling progressed to involve his entire face. The next day the patient was admitted to an outside hospital for intravenous vancomycin and ampicillin. His swelling did not progress and he was discharged several days later on oral antibiotics. He returned to the hospital five days after discharge with worsening symptoms. Intravenous antibiotics were restarted and the patient was transferred to our facility.

Figure 1. Axial and coronal, post contrast T1 weighted magnetic resonance images show enhancement in the superior orbit involving the left superior rectus/levator complex and extending into the surrounding orbital soft tissue

## CONCLUSION:

Much is still unknown about how COVID-19 will affect people over time, but research is ongoing. Researchers recommend that doctors closely monitor people who have had COVID-19 to see how their organs are functioning after recovery.

Although MRI is not a first-line diagnostic tool for COVID-19 patients, still it has certain values in following up, evaluating disease progression, detecting complications due to COVID-19



<https://ard.bmj.com/content/80/3/e42>

<https://onlinelibrary.wiley.com/doi/10.1002/mus.27003>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8254439/>

<https://www.tandfonline.com/doi/full/10.1080/01676830.2021.1962366>

<https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/coronavirus-long-term-effects/art-20490351>

**THANKS FOR YOUR LISTENING!**