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Редкая локализация аваскулярного некроза при лечении новой коронавирусной инфекции глюкокортикостероидами

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АННОТАЦИЯ

Развитие аваскулярного некроза костных структур, индуцированного лечением новой коронавирусной инфекции глюкокортикоидами, является довольно распространённым осложнением терапии, при этом чаще всего встречается поражение головок бедренных костей. Своевременное выявление аваскулярного некроза важно в рамках профилактики развития артрозов и других осложнений.

В работе представлен клинический случай пациентки в возрасте 54 лет, госпитализированной по поводу новой коронавирусной инфекции, с жалобами на выраженные боли в обоих коленных суставах через 2 недели от начала болезни. По результатам магнитно-резонансной томографии был выявлен выраженный аваскулярный некроз костей, формирующих коленный сустав, с обеих сторон. Консервативная терапия, включающая приём нестероидных противовоспалительных препаратов и ингибиторов костной резорбции из группы бисфосфонатов, дала выраженный положительный результат. При повторном осмотре через 3 месяца болей нет, сохраняются небольшие ограничения движений в коленных суставах. По данным магнитно-резонансной томографии обоих коленных суставов отмечено значительное уменьшение ранее выявленных изменений.

Побочные эффекты глюкокортикоидов (нарушение толерантности к глюкозе, повышение артериального давления, тахикардия, эрозивно-язвенное поражение желудочно-кишечного тракта, нарушения сна и др.) широко известны, однако остеонекроз костных структур коленных суставов, вызванный приёмом стероидов, редко попадает в поле зрения клиницистов. Приведённый клинический случай подчёркивает комплексный характер патогенеза остеонекроза и демонстрирует широкий спектр осложнений при терапии кортикостероидами.

Ключевые слова: клинический случай; аваскулярный некроз; остеонекроз; коронавирусная инфекция; коленный сустав; магнитно-резонансная томография.

Как цитировать

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Rare localization of avascular necrosis during treatment of COVID-19 with glucocorticosteroids

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ABSTRACT

The development of bony avascular necrosis induced by glucocorticoid treatment of COVID-19 is a common adverse effect, with femoral head being the most commonly affected. Timely detection of avascular necrosis is important in the prevention of osteoarthritis and other complications.

We present a clinical case of a 54-year-old patient hospitalized for novel coronavirus infection with complaints of severe pain in both knees 2 weeks after the disease onset. Magnetic resonance imaging revealed pronounced changes in both knees, corresponding to avascular necrosis. The results of conservative therapy, including non-steroidal anti-inflammatory drugs and bisphosphonate bone resorption inhibitors, produced a pronounced positive result. At follow-up examination 3 months later, there was no pain, but the knee joints still had slight restrictions of movement. Magnetic resonance imaging showed a significant decrease in the previously detected changes.

The side effects of glucocorticoids (impaired glucose tolerance, increased blood pressure, tachycardia, gastrointestinal erosive ulcers, sleep disorders, etc.) are widely known, but knee osteonecrosis caused by steroid intake rarely comes to the attention of clinicians. This clinical case emphasizes the complex nature of osteonecrosis pathogenesis and demonstrates a wide range of complications in corticosteroid therapy.

Keywords: case report; avascular necrosis; osteonecrosis; COVID-19; knee joint; magnetic resonance imaging.

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糖皮质激素治疗新型冠状病毒感染罕见局限性缺血性坏死

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简评

糖皮质激素治疗新型冠状病毒感染引起的骨结构缺血性坏死是一种相当常见的治疗并发症，其中最常见的是股骨头病变。对于预防关节炎和其他并发症，及时检测缺血性坏死是很重要的。

这项研究展示了一名54岁的患者的临床案例，她因新型冠状病毒感染住院，并在发病后两周内抱怨双膝关节疼痛。磁共振成像扫描显示，形成膝关节的骨骼在两侧都有明显的血管性坏死。使用非甾体抗炎药和双磷酸盐骨吸收抑制剂的保守治疗有显著的积极效果。3个月后复查时，没有疼痛，但膝关节的活动仍有轻微限制。两个膝关节的磁共振成像显示，先前确定的变化明显减少。

糖皮质激素的副作用（糖耐量受损、血压升高、心动过速、胃肠道侵蚀性溃疡、睡眠障碍等）广为人知，但由类固醇引起的膝关节骨结构的骨坏死却很少引起临床医生的注意。这个临床病例强调了骨坏死发病机制的复杂性，并展示了皮质类固醇治疗的广泛并发症。

关键词：临床病例；缺血性坏死；骨坏死；冠状病毒感染；膝关节；磁共振成像。

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研究的现实意义

2019年12月在中国武汉首次发现的一种新型冠状病毒感染已引起全球大流行。在新型冠状病毒感染的治疗中,糖皮质激素(GC)的应用在发病机制上是合理及广泛的[1]。然而,众所周知,不仅是密集使用,甚至是单次使用都会引起血管性坏死的发生[2]。文献描述了许多接受糖皮质激素治疗的患者发生股骨头缺血性坏死的病例[3, 4],然而,其他部位的骨坏死,尤其是膝关节,仅在个别病例中出现[5]。此类病理的早期诊断对于预防关节炎和其他并发症的发展极为重要[6]。

在这篇文章中,我们描述了一个在冠状病毒感染的GC治疗过程中出现的双膝关节骨结构无血管坏死的病例。

病例报告

关于患者

一名54岁的妇女主诉剧烈咳嗽和连续6天发烧高达39.5°C,因新型冠状病毒感染住院。胸部CT扫描显示超过30%的肺体积受损。确定了SARS-CoV-2 RNA聚合酶链反应的阳性结果。患者的躯体病史没有收到影响。

住院期间,患者接受了以下剂量的治疗:地塞米松肠外给药5天,每日剂量为20毫克,停药2天,再继续给药5天,剂量为12毫克,以及抗凝血剂治疗和抗分泌治疗。

发病第15天,膝关节出现剧烈疼痛,活动明显受限,持续至夜间;关节触诊疼痛。患者于第17天出院,由于膝关节疼痛,建议服用非甾体类抗炎药。

住院后1.5个月,由于持续主诉膝关节疼痛和活动受限,患者被转诊进行双膝关节磁共振成像(MRI)。

仪器检查的结果

根据左膝关节MRI:骨干远端、股骨髁(包括关节面)、髌骨均有不均匀高信号病变区在PD加权(质子加权)图像上抑制来自脂肪组织的信号,T1加权图像(T1-WI)上的低/等信号,不规则(“地理”)形状,在中央部分,可以看到具有黄骨髓信号特征的区域(图1)。右膝关节的MRI检查显示两个股骨髁的骨髓有类似变化的区域,并扩散到远端干骨后端和外侧髌骨的关节面,以及髌骨。沿着一些显露病变区的外围,在短距离内可见“双线”症状(图2)。

由于现有的病史和核磁共振扫描发现的变化,诊断为“形成两侧膝关节的骨骼缺血性坏死”。

诊断、治疗

根据MRI结果,结合病史和临床表现,诊断为双膝关节股骨和胫骨骨髁缺血性坏死。在这方面,保守疗法(物理疗法)规定如下:使用含有非甾体类抗炎成分的凝胶进行磁疗和超声透入疗法,疼痛情况下,片剂形式的非甾体类抗炎药,维生素D制剂,双磷酸盐骨吸收抑制剂。

在3个月后的治疗背景下,出现了明显的积极趋势:疼痛综合症停止了;膝关节的运动受到轻微限制(无法深蹲)。

双膝关节的重复MRI显示出积极的趋势:之前发现的变化不太明显(图3、4)。

讨论

新型冠状病毒感染患者骨坏死的患病率差异很大——从5%到58%[7],其中股骨头病变更为常见,而膝关节和其他骨骼的骨结构损伤则较少见。

在膝关节骨骼结构的继发性骨坏死中,即无血管性坏死,通常两个股骨髁都受到影响,如本临



图1. 左膝关节的初级磁共振成像: PD-WI在冠状面(a)和矢状面(b)中具有来自脂肪组织的信号抑制,矢状面中的T1-WI(c)。箭头表示股骨和胫骨髁的异质、不规则形状(“地理”)MRI信号形式的骨髓水肿区域。

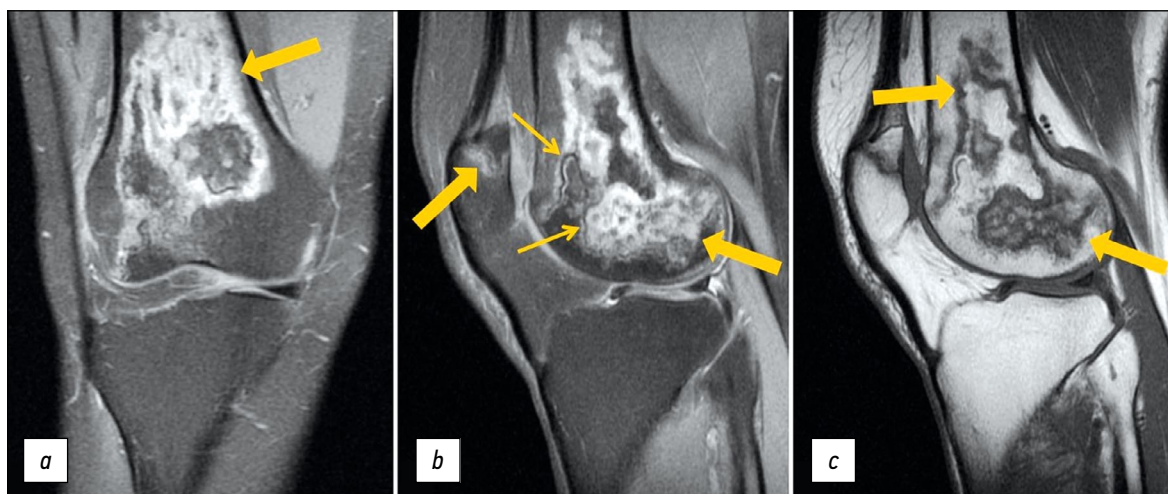


图2。右膝关节的初级磁共振成像：PD-WI在冠状面（a）和矢状面（b）中具有来自脂肪组织的信号抑制，矢状面中的T1-WI（c）。粗箭头表示股骨髁和髌骨的异质、不规则形状（“地理”）MRI信号形式的骨髓水肿区域；细箭头表示PD-WI上内部高信号（肉芽组织）和外部低信号（骨硬化）线形式的“双线”症状。

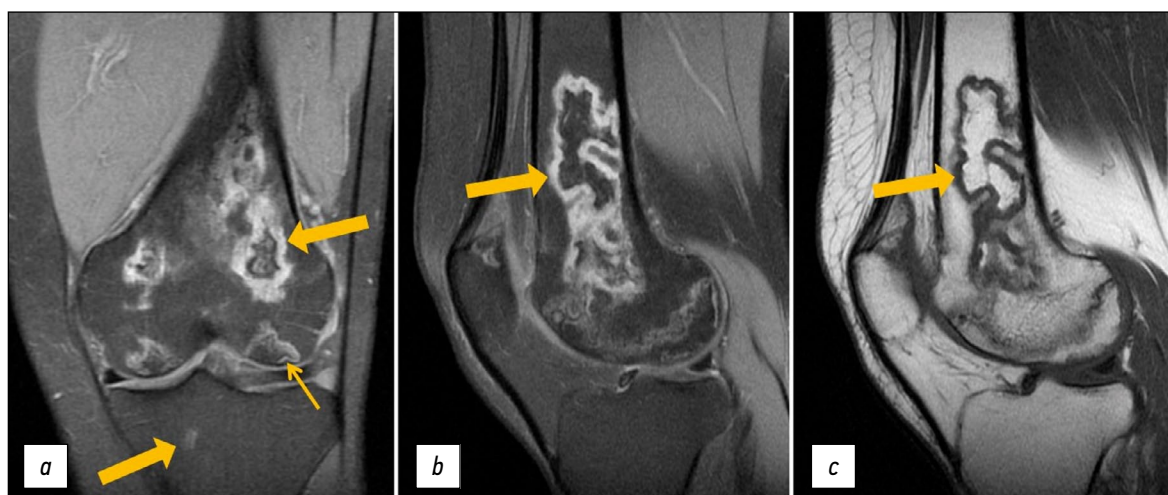


图3。左膝关节的重复磁共振成像：PD-WI在冠状面（a）和矢状面（b）中具有来自脂肪组织的信号抑制，矢状面中的T1-WI（c）。粗箭头表示股骨髁和髌骨的异质、不规则形状（“地理”）MRI信号形式的骨髓水肿区域；细箭头表示PD-WI上内部高信号（肉芽组织）和外部低信号（骨硬化）线形式的“双线”症状。

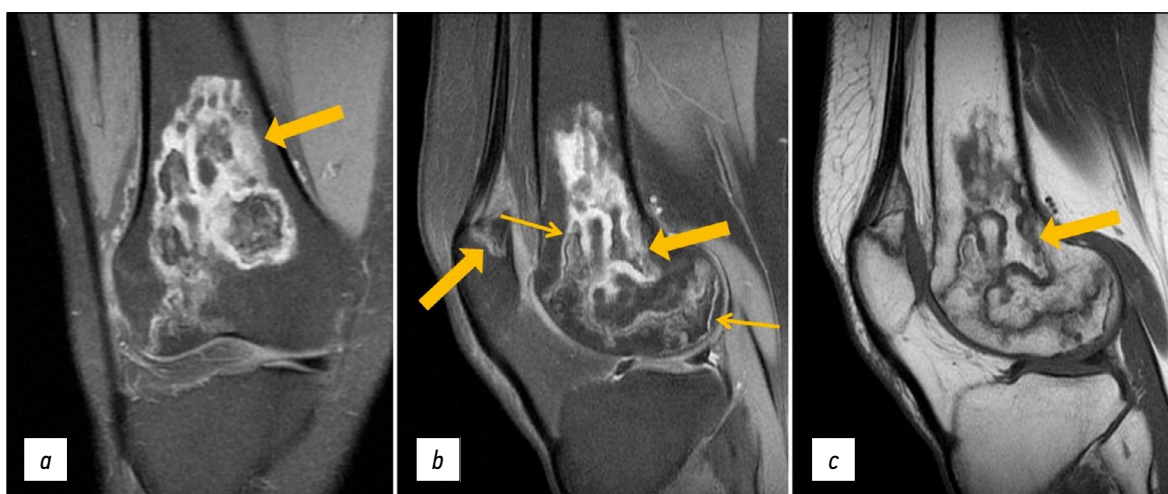


图4。右膝关节的重复磁共振成像：PD-WI在冠状面（a）和矢状面（b）中具有来自脂肪组织的信号抑制，矢状面中的T1-WI（c）。粗箭头表示股骨髁和髌骨的异质、不规则形状（“地理”）MRI信号形式的骨髓水肿区域；细箭头表示PD-WI上内部高信号（肉芽组织）和外部低信号（骨硬化）线形式的“双线”症状。

床病例；反过来，原发性骨坏死的特点是仅对一个骨髁造成损伤[8]。

发生缺血性坏死的原因包括糖皮质激素、肾脏疾病、血液病的治疗。一些作者注意到用于治疗冠状病毒感染的药物（例如洛匹那韦和利托那韦）对骨坏死发展的影响[9]。在所提供的案例中，这种病理状况很可能是在使用糖皮质激素治疗冠状病毒感染期间发生的。

GC作为治疗新型冠状病毒感染的重要制剂，是发生缺血性坏死的独立危险因素。同时，此类患者发生骨坏死的发病机制尚不完全清楚：除了GC治疗以外，血管血栓形成、脂肪细胞肥大、脂肪栓塞、高凝、内皮破坏和白细胞聚集均可成为独立原因[7, 10]。然而，文献中尚无因上述因素而发生骨坏死的病例[7, 9]。

目前对GC的使用期限或增加骨坏死风险的剂量没有明确的意见。然而，一系列研究表明，控制GC的累积剂量作为病理发展的重要因素非常重要[11]。例如，一些研究确定，膝关节骨结构的骨坏死是在泼尼松龙的累积剂量为1.012–6.562克时发生的[12, 13]，而在其他临床病例中，泼尼松龙的累积剂量为0.9–1.413克，平均为1.156克[14]。在我们描述的临床病例中，地塞米松的使用剂量为20毫克/天，随后减至12毫克。

S. R. Agarwala及合著者[14]描述了一名20岁女性的甲基强的松龙用药15天后出现无血管性坏死的病例，发病第25天出现膝关节疼痛，MRI显示双侧髌状突和髌骨有病变；一名感染新型冠状病毒的16岁男性，在使用甲基强的松龙和地塞米松治疗4个月后，出现双髌和右膝疼痛，持续19天。在这个病例中，地塞米松使用了10天，间断2天，15天后（从GC治疗开始的第9天）首次出现膝关节疼痛的主诉，这与上面第一位患者的临床例子相似，尽管我们患者的年龄明显不同。

另一个临床病例描述了一名78岁女性右膝关节缺血性坏死的发展，该女性有双侧膝关节病史，左侧更为明显，并伴有心血管疾病、肥胖[15]。治疗包括抗菌药物、羟氯喹、抗病毒药物（洛匹那韦、利托那韦）和氧疗。出院2周后，患者发现右膝关节疼痛加重。同时，由于支气管痉挛的出现，进行了9天的GC治疗。7天后，右膝关节出现局部水肿。MRI显示右股骨内侧髌骨坏死迹象。在这种情况下，仅GC对血管性坏死的影响是不明确的：同时存在的疾病也是骨坏死的一个风险因素。然而，冠状病毒感染和血管性坏死发展之间的时间很短，这表明GC给药的影响。在我们研究的临床病例中，除了服用GC以外，患者没有任何血管性坏死的危险因素，但是，如上例所示，在GC治疗期间关节痛的发展相当迅速。

另一方面，A. Sulewski及合著者[16]的研究结果表明，缺乏关于GC对骨坏死发展的直接影响的数据。这项工作包括对10名确诊冠状病毒感染和无血管性坏死迹象的患者进行分析。患者的平

均年龄为61岁。尽管10名患者中只有4名接受了包括GC的治疗，但他们中的每一个在发病后平均14天后都出现了无血管性坏死的迹象。W. Li等人[17]在一项荟萃分析中得到了类似的数据，证实了新型冠状病毒感染患者无血管性坏死的多因素发病机制理论。作者将血管紧张素转换酶2的缺乏列为这些患者发生无血管性坏死的一个可能因素，这可能导致骨质破坏以及血管血栓形成，就像GC治疗的骨坏死机制那样。因此，对于新型冠状病毒感染患者发生无血管性坏死的病因和发生机制，目前尚无明确意见。

无论是在我们介绍的临床病例还是在国外作者的研究著作中，对无血管性坏死的治疗均以保守治疗为主，主要目的是减轻疼痛，减缓骨坏死的进展，预防骨折和关节炎。然而，还没有描述普遍接受的治疗方案[18]。反过来，一系列研究人员证实，使用双膦酸盐的综合治疗可有效治疗骨坏死，包括在早期阶段，我们的临床病例证实了这一点[19, 20]。

因此，及早发现因新冠病毒感染而发生无血管性坏死的风险增加的患者，对于预防关节炎和其他并发症的发生极为重要。

结论

我们描述了一例因COVID-19的GC给药而通过MRI检测到的双侧膝关节形成骨的无血管性坏死的临床病例。使用GS的副作用，例如葡萄糖耐量降低、血压升高、心动过速、胃肠道的侵蚀性和溃疡性损伤、睡眠障碍，是广为人知的。然而，由GS引起的膝关节骨结构无血管性坏死很少引起临床医生的注意。这个临床病例强调了骨坏死发病机制的复杂性，并展示了GS治疗的广泛并发症。

ADDITIONAL INFORMATION

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