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COVID-19, "Lockdown" and Achilles Tendon Ruptures

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Abstract

Introduction

The COVID-19 pandemic has affected the types of trauma being operated on by Orthopaedic surgeons. Lifting of restrictions around sports saw a sudden return to play for people after a period of inactivity. Achilles tendon ruptures are associated with these episodic athletes. We hypothesised that easing of "Lockdown" restrictions led to increased presentations of Achilles tendon ruptures vs. the same period in 2019. We conducted a case-control study to investigate.

Methods

Data from electronic theatre logbooks of all operations performed from 27th March 2020 (Lockdown begins) to 31st July 2020 and 27th March 2019 to 31st July 2019 was collected. All operatively managed Achilles tendon ruptures were included. All other operations were excluded.

Results

772 total cases were performed in 2019. There were 17 Achilles tendon ruptures in that period (2.2%). 14 occurred after easing of restrictions. 580 total cases were performed in 2020. There were 13 Achilles tendon ruptures in that period (2.2%). 11 occurred after easing of restrictions and the return of sport. There was a greater incidence of Achilles tendon ruptures in 2019 vs. the equivalent "Lockdown" period in 2020.

Conclusion

COVID-19 pandemic restrictions and return to play after inactivity does not increase the incidence or rate of Achilles tendon rupture.

Introduction

The COVID-19 pandemic has changed the way we live. As Trauma & Orthopaedic surgeons, it has also affected our clinical activities. Elective procedures are being postponed and only now resuming normal order at time of writing, albeit with appropriate COVID-19 precautions in place. We are seeing a shift in the characteristics of our trauma patients. In the Republic of Ireland, we have seen a large upward trend in trauma-related "DIY" as people are confined to their homes. Bicycle-related trauma has increased too as people aim to stay active with the closure of gyms, swimming pools and other areas of recreational activity.

On 20th February 2020, COVID-19 was added to the list of notifiable diseases in Ireland. The 27th of February 2020 saw the first case on the island of Ireland[1]. The first case in the Republic of Ireland was announced two days later on the 29th February[2]. On the 27th of March 2020, the Republic of Ireland was deemed to be in full "lockdown" to help prevent the spread of COVID-19[3]. The measures taken coincided with an escalating death toll and as a response to increased reliance on intensive care units (ICUs).

A phased easing of restrictions began on the 18th May 2020. On June 29th, 2020, a further easing of restrictions was announced. As part of this, an allowance was made for outdoor team sports training and fixtures to return[4]. During a particular week in the month of July 2020, our unit operated on 8 ruptured Achilles tendons. This seemed to the authors at the time to be quite a large number. We would normally operate on 1-2 ruptured Achilles tendons per week. The authors hypothesised that the COVID-19 pandemic was having an impact on the presentations of such injuries to our department.

The Achilles tendon is the strongest tendon in the body, but it is also the most commonly injured. The overall incidence of Achilles tendon ruptures is increasing because of an increase in the prevalence of obesity, an aging population and an increased participation in sport[5,6]. It has an incidence worldwide of 18:100,000 and is more common in men between the ages of 30-40. Risk factors for Achilles tendon rupture include fluoroquinolone antibiotics, anabolic steroid use/misuse and episodic athletes or so-called "weekend warriors"[7]. The latter group is who we wanted to focus on for the purpose of our study. The sporting injury normally occurs due to sudden forced plantar flexion or violent dorsiflexion in a plantar flexed foot.

Our aim was to compare rates and incidence of Achilles tendon rupture in our department during the COVID-19 pandemic versus a similar time period in 2019. Our hypothesis was that the re-introduction of team sports as part of our national COVID-19 strategy increased rates & incidence of Achilles tendon rupture due to this episodic athlete or "weekend warrior" phenomenon. Large numbers of people went from a period of inactivity into sports that place a huge amount of eccentric stress on a tendon that has not been primed sufficiently. It was hypothesised that the rate and incidence would be higher than a similar period in 2019 pre-COVID-19 and government lockdowns.

We undertook a case-control study to see what effect COVID-19, "lockdown" and subsequent return-to-play had on the rates & incidence of Achilles tendon ruptures as our primary outcome measure. The secondary outcome measure was what effect COVID-19 had on the overall caseload in a busy trauma theatre. This is the first study of operatively managed Achilles tendon ruptures during the COVID-19 pandemic at the time of writing.

Methods

This was a retrospective case-control study of all Achilles tendon ruptures managed operatively in our department between specified dates in 2019 and 2020. The study start date was 27th March 2020 as this coincided with full "lockdown" in the Republic of Ireland. The study end date was the 29th July 2020. This date came 4 weeks after the easing of restrictions where team sports could return. As decided by the authors, this allowed sufficient time for the injuries to present to our unit and encompassed the previously mentioned week of 8 tendon ruptures that prompted the authors to conduct the study.

Rate and incidence of Achilles tendon ruptures managed surgically in our unit between 27th March 2019 and 29th July 2019 were also recorded. This was our control group. In this way, we hoped to see what effect, if any, the COVID-19 pandemic had on the numbers of presentations of Achilles tendon ruptures to our unit by comparing figures from 2019 vs. 2020. Our primary outcome measure was thus rate & incidence of Achilles tendon ruptures presenting during the COVID-19 pandemic.

The total number of operations performed for all causes in the study period was also recorded. A secondary outcome measure for this study was what effect, if any, the COVID-19 pandemic had on overall caseload in a busy trauma theatre.

Anonymous patient data was collected using our operating theatre's MetaVision system. In this way we could see the date of surgery, the procedure performed and the name of the performing consultant orthopaedic surgeon.

Inclusion criteria for the study were all Achilles tendon ruptures managed operatively during the study period in 2019 and 2020. Exclusion criteria were all operations performed during those same time periods for indications other than Achilles tendon rupture.

Results

In 2020, there were 580 operations performed in the trauma theatre(s) in our institution. In the control group (2019), a total of 772 operations were performed. This was a reduction of 28.1%.

The incidence of operatively managed Achilles tendon ruptures in the 2020 period was n=13. This gave a rate of 2.2% (13/580). (Fig. 1)

The incidence of operatively managed Achilles tendon ruptures in the control group was n=17. This gave a rate of 2.2% (17/772). (Fig. 1)

In 2020, 11 Achilles tendon ruptures occurred after the easing of government restrictions and team sports could return i.e., the period between 29th June 2020 & 29th July 2020.

In 2019, 14 Achilles tendon ruptures occurred in the same timeframe i.e., 29th June 2019 – 29th July 2019.

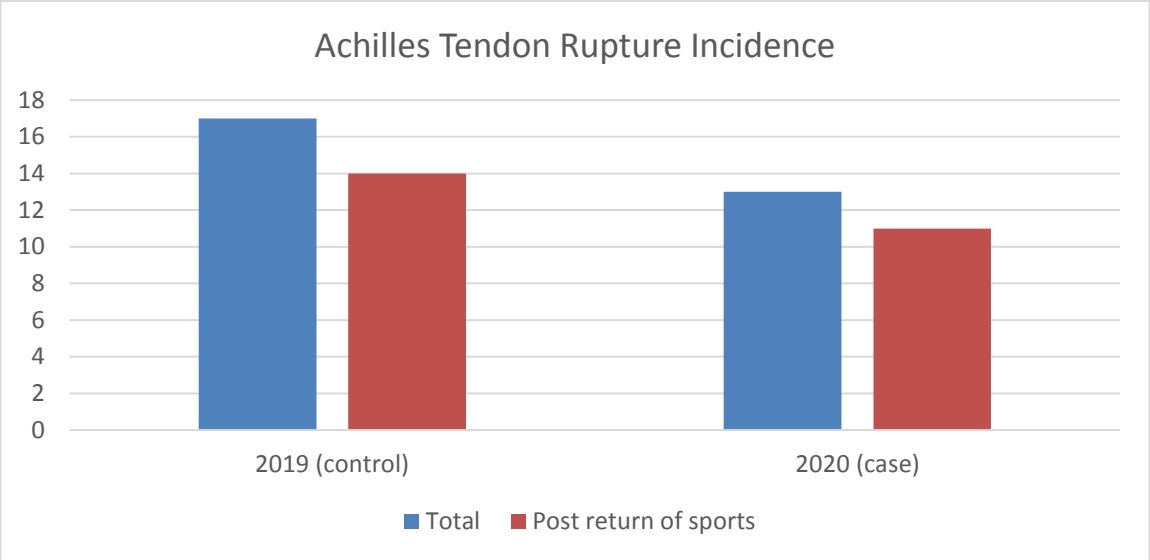

Fig. 1: Achilles tendon rupture incidence in 2019 versus 2020.

Of the 13 Achilles tendon ruptures in 2020, 12 of those were attributed to team sports. The patients felt the characteristic sudden "pop" in their heel while running or sprinting. The other patient was a direct trauma where a wheelbarrow struck him directly in his Achilles tendon.(Fig. 2)

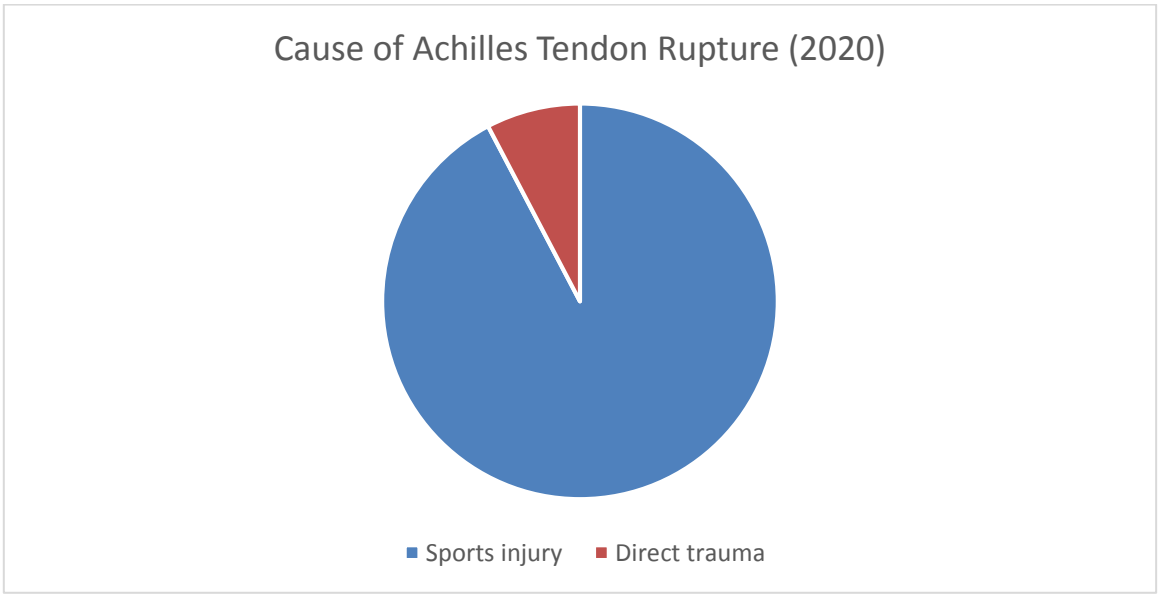

Fig. 2: Etiology of Achilles tendon ruptures during COVID-19 study period.

8 of the 13 Achilles tendon ruptures in 2020 occurred in a single, typical 5 day working week. These all occurred after the easing of restrictions on 29th June and re-introduction of team sports.

All patients from 2020 had a negative COVID-19 PCR swab within 48 hours of surgery.

Discussion

The COVID-19 pandemic caused a fundamental shift in the organisation and running of our healthcare systems. The patient is always at the forefront of the mind of the surgeon. However, a pandemic forces a change in strategy and the need to re-examine the service being delivered. Well over one calendar year into the pandemic, there is much to discover. Part of the reason for this study was to examine changing trends in the cases presenting to our emergency department and eventually finding their way into our trauma theatres. As surgeons, it is our duty to stay well-informed and as up to date as possible. We expected to see a new trend in the presentation of Achilles tendon ruptures given what we already know about their aetiology. With this in mind, we hoped to inform our future practice during this COVID-19 era and anticipate future service needs.

Our hypothesis that the sudden return-to-play after a government lockdown would influence presentations of Achilles tendon ruptures to our unit turned out to be false. Our department in fact saw a greater number of these cases in our control group from 2019. The rate of Achilles tendon rupture in 2020 and 2019 was the same (2.2%).

The period between the easing of restrictions and July 29th, 2020 was where we thought we would see the highest numbers of cases if our hypothesis was true. This was not the case as, again, the incidence of injury was still higher in the same time-matched period in 2019 vs. 2020.

An important secondary finding in this study was the level of surgical activity that persisted in our trauma theatre despite numerous COVID-19 logistical issues. We saw a reduction of 28.1% in our overall number of operative cases, but our department remained the busiest surgical specialty in the hospital and accounted for approximately 25% of all operations in our institution in 2020. This was achieved despite issues with pre-operative COVID-19 swabs. They could end up on a general run and take up to 4 hours to be resulted, be misplaced altogether if the patient had been sent from another institution or even come back indeterminate if the patient previously had COVID-19. Pre-operative COVID-19 questionnaires presented another challenge to getting patients to theatre as the answers given by patients could overrule a negative swab result and thus cause further delays by necessitating theatre cleaning and donning and doffing of PPE as we would have to then treat these patients as “positive”.

Fortunately, we were able to offer all patients surgery for their injury. Unlike other healthcare systems around the world, we were not forced to make difficult ethical decisions regarding whether to operate on these patients[8]. Of course, all necessary precautions were taken to ensure the safety of the patient, theatre staff and ward staff. COVID-19 swabs were readily available and so this made the decision to operate much easier for our institution[8].

Although operative and non-operative management of Achilles tendon ruptures has been shown to have similar outcomes[9], there are significant risks associated with the conservative route. There are studies to suggest that non-operative management of Achilles tendon ruptures may lead to a decrease in tendon strength[10]. The actual clinical significance of this weakness has however been called into question[9,11]. Tendon re-rupture risk has been quoted in the literature as high as 10-12%[12]. Others would disagree and maintain that the risk of re-rupture is the same for operative and non-operative management when a functional rehabilitation programme is used[9]. Studies also suggest that a person's ability to return to work and sports is faster with operative treatment versus non-operative treatment[9, 13]. During the COVID-19 pandemic, this is not as much of a factor when a lot of people are working from home and sport was the inciting cause of 92% of these injuries.

There were some limitations with our study. This is a single-centre study and so our results may not reflect what is happening in other institutions even within our own country. The 4-week period after the easing of restrictions where sports could return was perhaps too short. If we had extended that data collection period by another 4 weeks, then we may have seen a larger number of tendon ruptures given the large number (n=8) we saw in a single week in July. Many people may have still had reservations about returning to sport immediately after restrictions were eased and so we may have missed these potential Achilles tendon ruptures. The COVID-19 pandemic is a relatively new phenomenon and so a study like ours is difficult to assess given lack of previous studies on the topic.

This novel study of surgically managed Achilles tendon ruptures during the COVID-19 pandemic showed that there was no clear association between the pandemic and Achilles tendon ruptures. Our hypothesis that a period of imposed inactivity in the form of "lockdown" and then a sudden return-to-play would increase presentations of these injuries turned out to be false. On the contrary, there were a greater number of these injuries between the same dates in 2019. As a secondary outcome, we found that COVID-19 had a clear impact in terms of decreasing trauma cases for theatre. As we continue to examine the effects of COVID-19 on surgical activity, we would call on other Orthopaedic departments internationally to share their experiences with COVID restrictions and if they are seeing any trends in their operative caseload.

Declaration of Conflicts of Interest:
None to declare.

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