Al-Kindy College Medical Journal (KCMJ)

Research Article

An Epidemiological Review of the Impact of COVID-19 on Achilles Tendon Rupture Injuries, Experience from a Large London District General Hospital

Lena Al-Hilfi[1], Irrum Afzal[2*], Sarkhell Radha[1,2], Mohamed Abdalla[1], Mohammed Al-Maiyah[1]

[1] Croydon University Hospital, London, UK
[2] South West London Elective Orthopaedic Centre, London, UK
* Corresponding author's email: irrumaafzal@gmail.com

Article history:
Received 22 February 2025
Accepted 15 May 2025
Available online 1 August 2025

https://doi.org/10.47723/sgbqc720

Keywords: COVID-19; pandemic, Achilles Tendon Rupture; Sports, Injury; Foot and Ankle

ABSTRACT

Background: During the lockdown for COVID-19, hospitals experienced a reduction in the number of trauma admissions related to high energy, sport, and occupational injuries. As lockdown measures began to ease, hospitals experienced a high admission rate of patients presenting with Achilles Tendon Rupture [ATR]. However, in the post-pandemic phase, the number of cases reduced. The aim of this paper is to report changes in incidence and identify changes in demographics, mechanism of injury, and Achilles Tendon Rupture management pre- and post-pandemic.

Subjects and Methods: We undertook a review during six different time periods of our Achilles Tendon Rupture patients, the time periods included: pre-pandemic, during the first after the first lockdown, during the second lockdown, after the second lockdown and the post-pandemic period. Patient's demographics, mechanism of injury, past medical history, the use of steroids and patient management, Achilles tendon Total Rupture Score (ATRS) were all included.

Results: One hundred and sixty-three patients were included in the study. During the second lockdown, the average age of patients was significantly lower than any other group [p <0.005]. 40% of patients after the first lockdown [August 2020- December 2020] were treated surgically and this was significant [p-value <0.005], during all other time periods; the vast majority of patients were treated conservatively. For the entire cohort, 71.78% of patients were treated conservatively, whilst the other 28.22% were treated surgically. There was no statistical difference in the Achilles Tendon Rupture Score-based [p-value - 0.729] when comparing the management of Achilles Tendon Rupture, at least 8 months post-treatment.

Conclusions: During each national lockdown, there was a decrease in the number of patients who presented with Achilles Tendon Rupture to hospital. Following the second lockdown, the number of patients who presented with ATR has significantly increased. However, in the post-pandemic phase, the number of cases decreased again. The study also found no significant difference in long-term outcomes as measured by the Achilles Tendon Rupture Score (ATRS), regardless of treatment approach. These findings suggest that the pandemic had a transient but marked impact on Achilles Tendon Rupture incidence, and further research is needed to explore the underlying mechanisms of this pattern, as well as the long-term outcomes and potential preventive strategies for Achilles Tendon Rupture in the post-pandemic era.

Introduction

The Achilles tendon [AT] ranks as the strongest tendon in the human body and is the largest, multifunctional, and most crucial tendon [1]. The tendon connects gastrocnemius, plantaris and soleus muscles to the calcaneus bone. In addition, it plays a pivotal role in knee flexion, ankle plantar flexion, and inversion of the hindfoot [2].

However, despite being the strongest tendon, it is known to be the most commonly ruptured tendon in the lower extremity [1]. The incidence rates of Achilles tendon ruptures [ATR] vary in the literature [3-5]. Huttunen et al [2012], reported an increase in the incidence of ATR in Sweden between 2001 and 2012, with an increase of 17% in men and 22% in women [3]. I

In a recent study, by Costa ML et al [6] reported that Achilles rupture affects over 11,000 people each year in the UK, and the incidence is increasing as the population remains more active into older age. The injury usually occurs in adults in their third to fifth decade [7]. ATR has several common locations for the injury, studies have shown that a 2-6 cm area that is proximal to calcaneal insertion is the commonest area for injury as it corresponds to a watershed region of poor vascularization [8,9]. Given the broad array of critical functions that the AT helps to provide, injury can be devastating. The incidence of ATR tends to be higher among episodic athletes or so-called "weekend warriors" [10].The causes and mechanisms of ATR are multifactorial ranging from patient-related factors to external factors such as sporting injuries. ATR is typically produced by a single high-load impact, through violent or sudden ankle dorsiflexion and long-standing tendinopathy or intratendinous degenerative conditions [11-15].

The World Health Organization [WHO] declared a pandemic alert after the spread of COVID-19 on March 10, 2020. As a result of this of the global pandemic, countries had to implement different measures to reduce transmission [16]. In the United Kingdom, the first lockdown was announced on the 23rd of March with strict measures including stopping all outdoor activities. This resulted in the cessation of group sporting and public activities until June 2020. However, due to the increased number of cases in the Winter of 2020, there was another lockdown from January 2021 until April 2021.

Interestingly, during lockdown periods there was a decrease in the number of ATR admissions to our hospital compared to the period pre-pandemic and post-lockdown. In light of this, we undertook a retrospective epidemiological review of the ATRs, which had presented to our large London district general hospital during five different time periods pre-pandemic, during the pandemic, and post-pandemic. The aim of this paper is to report changes in incidence and identify changes in demographics, mechanism of injury, and ATR management pre and post-pandemic.

Subjects and Methods

A retrospective case series utilising data from a large London-based district was undertaken between December 2018 and May 2022. The analysis was undertaken between six time periods: pre-pandemic [12th December 2018 - 10th March 2020] – Group 1, during the first lockdown [11th March 2020 – 31st July 2020] – Group 2, after the first lockdown [1st August 2020- 31st December 2020]- Group 3, during the second lockdown [1st January 2021- 11th April 2021] – Group 4, after the second lockdown [12th April 2021 – 31st December 2021] – Group 5and the post-pandemic period [1st January 2022 until 22nd May 2022] – Group 6 [16].

Medical records of the patients who presented with ATR during the six time periods at our hospital were collected through our trust electronic health record system, CERNER Millenium [North Kansas City, MO, USA ™]. Data collected included: Patient's demographics, mechanism of injury, past medical history, and patient management. The line of treatment; conservative versus surgical treatment was decided following a discussion between the patient and the doctor and obtaining informed consent.

The Achilles tendon Total Rupture Score (ATRS)

The ATRS is a patient-reported, injury-specific instrument developed in 2007 to specifically evaluate outcomes after treatment in patients with ATR. This questionnaire is a self-administered instrument, filled out by the patient and scored by the clinician. It consists of ten items evaluating aspects of symptoms and function following the presentation of ATR. Each item has scores ranging between 0 and 100 on a Likert scale. The instrument, therefore, has a maximum score of 100, which corresponds to no symptoms and full function.

Data were tabulated using Microsoft Excel [Microsoft, Redmond, WA™] and analysed using SPSS Version 23 [IBM, SPSS Statistics ™]. Statistical significance was determined using Fisher Exact test and Mann-Whitney U Test, with a significance level set at 0.05.

Results

One hundred and sixty-three patients were included in this study of which 127 [77.91%] were male with an average age of 41.44 years and 36 [22.09%] were female with an average of age 43.49 years. A Mann-Whitney U test showed males were statistically younger [P<0.005] at the time of their ATR injury when compared to females. Figure 1 shows a graph with the number of cases during each time period from pre-pandemic to post-pandemic.

The average age of patients during the second lockdown was statistically significantly lower than any other group [p-value <0.005] From the entire cohort of patients who presented with ATR, 99 patients had no existing comorbidities recorded. Of the 60 patients with reported co-morbidities, of these two patients reported having osteoarthritis and rheumatoid arthritis, four patients reported having previous orthopaedic surgery unrelated to the ATR and three patients reported a contralateral ATR.

80.98% [132] of the patients suffered an ATR due to a sporting injury and 19.01% [31] suffered an ATR due to a fall. During each time, the sporting injury was statistically higher [P<0.005] compared to patients having a fall

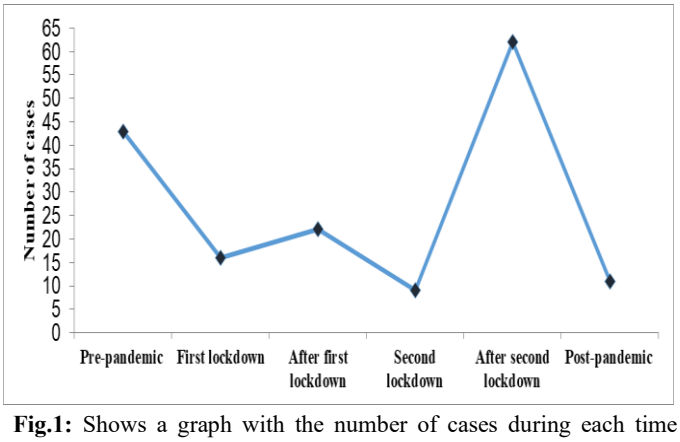

Fig.1: Shows a graph with the number of cases during each time period.

Table 1: Shows a breakdown of the number of cases, average cases per month, number per 100,000 per annum, the average age at injury, and the mechanism for injury

Dates	Time period	Number of Cases [M:F]	Average per month	Number of per 100,000 per annum	Average Age at Injury Years	Mechanism of injury [Number of Sporting: Number of falls]
12th December 2018- 10th March 2020	Pre-pandemic – Group 1	43 [33:10]	3	9	45.75	35:8
11th March 2020 – 31st July 2020	First [1st] Lockdown – Group 2	16 [12:4]	4	10	41.85	14:2
1st August 2020- 31st December 2020	After first [1st] Lockdown – Group 3	22 [19:3]	5	14	41.17	16:6
1st January 2021- 11th April 2021	Second [2nd] Lockdown – Group 4	9 [7:2]	2	7	36.67	6:3
12th April 2021-22nd May 2022	After second [2nd] Lockdown –Group 5	62 [46:16]	5	14	40.11	52:10
1st January 2022 – 22nd May 2022	Post-pandemic _ Group 6	11 [10:1]	2	7	43.64	9:2

Table 2: Shows a breakdown of the treatment management for the patients.

Date	Operative management	Percentage [%]	Conservative Treatment	Percentage [%]
Pre-pandemic – Group 1	12	26.19	31	73.81
1st Lockdown –Group 2	3	18.75	13	81.25
After 1st Lockdown – Group 3	9	40.90	13	59.09
2nd Lockdown – Group 4	2	22.22	7	77.78
After 2nd Lockdown – Group 5	15	24.19	47	75.81
Post-pandemic – Group 6	5	45.45	6	54.55

Table 3. Shows females had statistically lower ATRS when compared to males [p<0.003]

Gender [N]	**Average ATRS [SD]**	**Range**
Male – 106	70.61[11.50]	43-94
Female - 30	62.61 [14.06]	40-88

Table 4. Shows the average ATRS depending on the treatment type.

Treatment	**Average ATRS [SD]**	**Range**
Surgical	66.33 [12.32]	45-91
Conservative	67.5 [14.15]	40-94

For the entire cohort, 71.78% of patients were treated conservatively, whilst the other 28.22% were treated surgically, this was statistically significant [p-value <0.005]. Each time-point, the number of patients opting for Conservative Treatment was statistically significant when compared to surgical intervention.

The Achilles tendon Total Rupture Score [ATRS].

83.44% [136 out of 163] patients completed their ATR score following the presentation of ATR in the hospital. The average score [SD] was reported as 68.79 [12.54]. The lowest score was reported as 40 and the highest score was reported as 94. The median ATRS was 69 for the entire cohort of patients.

Discussion

To the best of our knowledge, this is the first study to conduct a comprehensive retrospective analysis of differences in incidence, demographics, and management in ATR between six different time periods pre and post-COVID-19 pandemic.

Due to the increase in involvement in a variety of sports, the incidence has been on the rise since the 1980s; significantly in the past 50 years 8. A review of the literature to date demonstrates demographically that the classical presentation for ATR is experienced in sportsmen in their fourth decade, with a ratio of 20:1 for males to females respectively8. Our data correlate with the literature and shows that patients presented to our hospital were predominantly male [115 male: 35 female]. Our data also demonstrates that sporting injuries are the most common cause of ATR during all time periods.

Interestingly, our study indicates that the average age for patients presented to our hospital during the six different time periods was 41.44 years for males and 43.49 years for females. Males were statistically younger [P<0.005] at the time of their ATR injury when compared to females. This is higher than what was demonstrated by Lemme et al, [2018], they showed that the highest age group presenting with ATR is between 20-39 years old [17]. This can be explained by the likelihood of increased physical activity and sports involvement in the older age group [18,19]. However, the average age for patients presenting during the second lockdown [January 2021-April 2021] was significantly lower [p-value <0.005] than the other groups with an average of 36.67 years. The increase in ATR incidence in the younger age group after the second lockdown can be explained by the rapid return to physical activity after a long period of inactivity.

Puga et al, [2022] [20], looked into different injury incidents among football players during American National Football League [NFL] in 2020. Their data showed a significantly increased number of overall injuries prevalence during the 2020 season compared to the 2018 and 2019 seasons. Puga et al. further braced their findings with Myer et al. study [21] finding, which reported that there was an increase in ATR incidence among players in the 2011 pre-season, after the NFL shutdown in 2011. These two studies support our findings; after the second lockdown, there was a noticeable jump in the number of patients who presented with ATR compared to all other times period. Also, the number of ATR after the second lockdown, from April 2021-Decemeber 2021 was more than the number who presented pre-covid and post-Covid era. In contrast to our findings and the aforementioned studies, a recent retrospective case-control study that was conducted by Murphy et al [10], in which they reviewed the incidence of ATR managed surgically in their unit between 27th of March 2019 – 29th of July 2019 [control group], against 27th of March 2020 - 29th of July 2020 period which represents the period after a lockdown in the republic of Ireland. Return to play after COVID-19 pandemic restrictions and inactivity does not increase the incidence or rate of Achilles tendon rupture. In this study operatively managed Achilles tendon ruptures were included, and data were obtained from electronic theatre logbooks over the study period. This study only discussed operatively treated ATR, therefore it might not be comparable to our study, 71.78% of patients in our study were treated conservatively. Conservative management currently is the preferred method of management [22-24].

A study from another London hospital showed a higher incidence of lower limb tendon rupture [25]. They observed a significant increase in the incidence of both Achilles and patellar tendon ruptures in 2020. The reported ATR incidence was the highest in 2020 with 16 in comparison to 8 in 2019 and 14 in 2021. The increase in ATR occurred as exercise allowance increased.

Puga et al [20], stated that The astronomical increase in sport injury prevalence during the 2020 season over the previous years raises the possibility that there was a reduced physiological adaptation to stress, due to the limited amount of training as a result of the closure of practice facilities to slow the spread of COVID-19.

During all time periods, our study shows that there was no change in the management trend of ATR between pre and post-COVID-19 periods; with the number of patients treated conservatively significantly higher than the number of patients who opted for surgical intervention; 71.78% to 28.22%.

In conclusion, COVID-19 has affected the number of patients presented to our hospital with ATR. There was a decrease in the number of patients who presented with ATR during each lockdown as opposed to an incidence increase after the second lockdown was lifted. Moreover, our data show a change in the average patients' age presented with ATR compared to other studies, with no change in the management plan. There was no statistical difference in the ATRS-based [p-value - 0.729] on the management of ATR.

Further research is needed into potential preventative measures, and longer-term outcomes. Future work should include multi-centre studies to analyse the correlation between changing periods of inactivity and increased incidence of ATR.

Funding

This research did not receive any specific fund.

Conflict of Interest

Authors declare no conflict of interest.

Data availability

Data are available upon reasonable request.

ORCID

Lena Al-Hilfi 0000-0003-2425-6468
Irrum Afzal 0000-0003-0199-8725
Sarkhell Radha 0000-0003-4505-2181

References

[1] Willits K, Amendola A, Bryant D, Mohtadi NG, Giffin JR, Fowler P, Kean CO, Kirkley A. Operative versus nonoperative treatment of acute Achilles tendon ruptures: a multicenter randomized trial using accelerated functional rehabilitation. JBJS. 2010 Dec 1;92(17):2767-75. https://doi.org/10.2106/jbjs.i.01401

[2] Egger AC, Berkowitz MJ. Achilles tendon injuries. Current reviews in musculoskeletal medicine. 2017 Mar;10:72-80. https://doi.org/10.1007/s12178-017-9386-7

[3] Huttunen TT, Kannus P, Rolf C, Felländer-Tsai L, Mattila VM. Acute Achilles tendon ruptures: incidence of injury and surgery in Sweden between 2001 and 2012. The American journal of sports medicine. 2014 Oct;42(10):2419-23. https://doi.org/10.1177/0363546514540599

[4] Leppilahti J, Puranen J, Orava S. Incidence of Achilles tendon rupture. Acta Orthopaedica Scandinavica. 1996 Jan 1;67(3):277-9. https://doi.org/10.3109/17453679608994688

[5] Maffulli N, Waterston SW, Squair J, Reaper J, Douglas S. Changing incidence of Achilles tendon rupture in Scotland: a 15-year study. Clinical Journal of Sport Medicine. 1999 Jul 1;9(3):157-60. https://doi.org/10.1097/00042752-199907000-00007

[6] Costa ML, Achten J, Wagland S, Marian IR, Maredza M, Schlüssel MM, Liew AS, Parsons NR, Dutton SJ, Kearney RS, Lamb SE. Plaster cast versus functional bracing for Achilles tendon rupture: the UKSTAR RCT. Health Technology Assessment (Winchester, England). 2020 Feb;24(8):1. https://doi.org/10.3310/hta24080

[7] Järvinen TA, Kannus P, Maffulli N, Khan KM. Achilles tendon disorders: etiology and epidemiology. Foot and ankle clinics. 2005 Jun 1;10(2):255-66. https://doi.org/10.1016/j.fcl.2005.01.013

[8] Gulati V, Jaggard M, Al-Nammari SS, Uzoigwe C, Gulati P, Ismail N, Gibbons C, Gupte C. Management of achilles tendon injury: a current concepts systematic review. World journal of orthopedics. 2015 May 18;6(4):380. https://doi.org/10.5312/wjo.v6.i4.380

[9] Medina Pabón MA, Naqvi U. Achilles Tendonitis. In: StatPearls. Treasure Island [FL]: StatPearls Publishing; 2022.

[10] Murphy B, Miller P, Molloy A, O'Toole G, Curtin P, Flavin R, O'Shea K, Cassar-Gheiti A, Hurson C. COVID-19,"Lockdown" and Achilles Tendon Ruptures. Irish Medical Journal. 2021 Aug 19;114(8):437.

[11] Blaise williams DS, Hertel J, Ingersoll CD, Newman DP. Chapter 24 - Rehabilitation of Leg, Ankle, and Foot Injuries. In: Magee DJ, Zachazewski JE, Quillen WS, Manske RC, editors. Pathology and Intervention in Musculoskeletal Rehabilitation [Second Edition

[12]]. W.B. Saunders; 2016 [cited 2023 Feb 27]. p. 851–80

[13] Hess GW. Achilles tendon rupture: a review of etiology, population, anatomy, risk factors, and injury prevention. Foot & ankle specialist. 2010 Feb;3(1):29-32. https://doi.org/10.1177/1938640009355191

[14] Shamrock AG, Varacallo M. Achilles Tendon Rupture. In: StatPearls. Treasure Island [FL]: StatPearls Publishing; 2022.

[15] Tarantino D, Palermi S, Sirico F, Corrado B. Achilles tendon rupture: mechanisms of injury, principles of rehabilitation and return to play. Journal of functional morphology and kinesiology. 2020 Dec 17;5(4):95. https://doi.org/10.3390/jfmk5040095

[16] Aicale R, Tarantino D, Maffulli N. Basic science of tendons. Bio-orthopaedics: a new approach. 2017:249-73 http://dx.doi.org/10.1007/978-3-662-54181-4_21

[17] She J, Liu L, Liu W. COVID-19 epidemic: disease characteristics in children. Journal of medical virology. 2020 Jul;92(7):747-54. https://doi.org/10.1002/jmv.25807

[18] Lemme NJ, Li NY, DeFroda SF, Kleiner J, Owens BD. Epidemiology of Achilles tendon ruptures in the United States: athletic and nonathletic injuries from 2012 to 2016. Orthopaedic journal of sports medicine. 2018 Nov 21;6(11):2325967118808238. https://doi.org/10.1177/2325967118808238

[19] DeFroda SF, Feller R, Klinge SA. Surgical management of the aging athlete. Current Sports Medicine Reports. 2016 Nov 1;15(6):426-32. https://doi.org/10.1249/jsr.0000000000000310

[20] Lantto I, Heikkinen J, Flinkkilä T, Ohtonen P, Leppilahti J. Epidemiology of A chilles tendon ruptures: Increasing incidence over a 33-year period. Scandinavian journal of medicine & science in sports. 2015 Feb;25(1):e133-8. https://doi.org/10.1111/sms.12253

[21] Puga TB, Schafer J, Agbedanu PN, Treffer K. COVID-19 return to sport: NFL injury prevalence analysis. JMIRx Med. 2022 Apr 22;3(2):e35862. https://doi.org/10.2196/35862

[22] Myer GD, Faigenbaum AD, Cherny CE, Heidt Jr RS, Hewett TE. Did the NFL Lockout expose the Achilles heel of competitive sports?. journal of orthopaedic & sports physical therapy. 2011 Oct;41(10):702-5. https://doi.org/10.2519/jospt.2011.0107

[23] Mattila VM, Huttunen TT, Haapasalo H, Sillanpää P, Malmivaara A, Pihlajamäki H. Declining incidence of surgery for Achilles tendon rupture follows publication of major RCTs: evidence-influenced change evident using the Finnish registry study. British journal of sports medicine. 2015 Aug 1;49(16):1084-6. https://doi.org/10.1136/bjsports-2013-092756

[24] Aujla RS, Patel S, Jones A, Bhatia M. Non-operative functional treatment for acute Achilles tendon ruptures: The Leicester Achilles Management Protocol (LAMP). Injury. 2019 Apr 1;50(4):995-9. https://doi.org/10.1016/j.injury.2019.03.007

[25] Hutchison AM, Topliss C, Beard D, Evans RM, Williams P. The treatment of a rupture of the Achilles tendon using a dedicated management programme. The Bone & Joint Journal. 2015 Apr 1;97(4):510-5. https:/doi.org/10.1302/0301-620X.97B4.35314

[26] Corrigendum to: 523 Effect of the COVID-19 UK Lockdown on Lower Limb Tendon Ruptures. British Journal of Surgery. 2023 Mar 1;110[3]:392Achilles tendon ruptures: The Leicester Achilles Management Protocol [LAMP]. Injury.

To cite this article: Al-Hilfi L, Afzal I, Radha S, Abdalla M, Al-Maiyah M. An epidemiological review of the impact of COVID-19 on Achilles Tendon Rupture injuries, - experience from a large London District General Hospital. Al-Kindy Col. Med. J. 2025;21(2):117-122
https://doi.org/10.47723/sgbqc720