MINIREVIEWS
8808  Ear, nose, and throat manifestations of COVID-19 and its vaccines
   Al-Ani RM

8816  Potential influences of religiosity and religious coping strategies on people with diabetes
   Onyishi CN, Eseadi C, Ilechukwu LC, Okoro KN, Okolie CN, Egbele E, Asogwa E

ORIGINAL ARTICLE
Case Control Study
8827  Effectiveness of six-step complex decongestive therapy for treating upper limb lymphedema after breast cancer surgery

Retrospective Study
8837  Hospital admissions from alcohol-related acute pancreatitis during the COVID-19 pandemic: A single-centre study
   Mak WK, Di Mauro D, Pearce E, Karran L, Myintmo A, Duckworth J, Orabi A, Lane R, Holloway S, Manzelli A, Mossadegh S

8844  Indocyanine green plasma clearance rate and 99mTc-galactosyl human serum albumin single-photon emission computed tomography evaluated preoperative remnant liver
   Iwaki K, Kathara S, Kita R, Kitamura K, Hashida H, Uryuhara K

8854  Arthroscopy with subscapularis upper one-third tenodesis for treatment of recurrent anterior shoulder instability independent of glenoid bone loss

8863  Evaluation of the prognostic nutritional index for the prognosis of Chinese patients with high/extremely high-risk prostate cancer after radical prostatectomy
   Yang F, Pan M, Nie J, Xiao F, Zhang Y

Observational Study
8872  Chlorine poisoning caused by improper mixing of household disinfectants during the COVID-19 pandemic: Case series
   Lin GD, Wu JY, Peng XB, Lu XX, Liu ZY, Pan ZG, Qiu ZW, Dong JG

8880  Mental health of the Slovak population during COVID-19 pandemic: A cross-sectional survey
   Kralova M, Brazinova A, Sivcova V, Izakova L
## Contents

**Prospective Study**

8893  Arthroscopic anatomical reconstruction of lateral collateral ligaments with ligament advanced reinforcement system artificial ligament for chronic ankle instability  
*Wang Y, Zhu JX*

**SYSTEMATIC REVIEWS**

8906  How to select the quantitative magnetic resonance technique for subjects with fatty liver: A systematic review  
*Li YW, Jiao Y, Chen N, Gao Q, Chen YK, Zhang YF, Wen QP, Zhang ZM*

8922  Lymphocytic choriomeningitis virus: An under-recognized congenital teratogen  
*Ferenc T, Vujica M, Mezlja A, Vilbic-Cavlek T*

**CASE REPORT**

8932  Alagille syndrome associated with total anomalous pulmonary venous connection and severe xanthomas: A case report  

8939  Colo-colonic intussusception with post-polypectomy electrocoagulation syndrome: A case report  
*Moon JY, Lee MR, Yun SK, Ha GW*

8945  Portal vein gas combined with pneumatisis intestinalis and emphysematous cystitis: A case report and literature review  
*Hu SF, Liu HB, Hao YY*

8954  Quadricuspid aortic valve and right ventricular type of myocardial bridging in an asymptomatic middle-aged woman: A case report  
*Sopek Merkaš I, Lakušić N, Paar MH*

8962  Treatment of gastric carcinoma with lymphoid stroma by immunotherapy: A case report  
*Cui YJ, Ren YY, Zhang HZ*

8968  Gallstone associated celiac trunk thromboembolisms complicated with splenic infarction: A case report  
*Wu CY, Su CC, Huang HH, Wang YT, Wang CC*

8974  Extracorporeal membrane oxygenation for lung cancer-related life-threatening hypoxia: A case report  
*Yoo SS, Lee SY, Choi SH*

8980  Multi-disciplinary treatment of maxillofacial skeletal deformities by orthognathic surgery combined with periodontal phenotype modification: A case report  
*Liu JY, Li GF, Tang Y, Yan FH, Tan BC*

8990  X-linked recessive Kallmann syndrome: A case report  
*Zhang P, Fu JY*

8998  Delayed complications of intradural cement leakage after percutaneous vertebroplasty: A case report  
*Ma QH, Liu GP, Sun Q, Li JG*
Contents

World Journal of Clinical Cases
Thrice Monthly Volume 10 Number 25 September 6, 2022

9004 Coexistent Kaposi sarcoma and post-transplant lymphoproliferative disorder in the same lymph nodes after pediatric liver transplantation: A case report

9012 Misdiagnosis of pancreatic metastasis from renal cell carcinoma: A case report
Liang XK, Li LJ, He YM, Xu ZF

9020 Discoid medial meniscus of both knees: A case report
Zheng ZR, Ma H, Yang F, Yuan L, Wang GD, Zhao XW, Ma LF

9028 Simultaneous laparoscopic and arthroscopic excision of a huge juxta-articular ganglionic cyst compressing the sciatic nerve: A case report
Choi WK, Oh JS, Yoon SJ

9036 One-stage revision arthroplasty in a patient with ochronotic arthropathy accompanied by joint infection: A case report
Wang XC, Zhang XM, Cai WL, Li Z, Ma C, Liu YH, He QL, Yan TS, Cao XW

9044 Bladder paraganglioma after kidney transplantation: A case report
Wang L, Zhang YN, Chen GY

9050 Total spinal anesthesia caused by lidocaine during unilateral percutaneous vertebroplasty performed under local anesthesia: A case report
Wang YF, Bian ZY, Li XX, Hu YX, Jiang L

9057 Ruptured splenic artery aneurysms in pregnancy and usefulness of endovascular treatment in selective patients: A case report and review of literature
Lee SH, Yang S, Park I, Im YC, Kim GY

9064 Gastrointestinal metastasis secondary to invasive lobular carcinoma of the breast: A case report
Li LX, Zhang D, Ma F

9071 Post-bulbar duodenal ulcer with anterior perforation with kissing ulcer and duodenocaval fistula: A case report and review of literature
Alzerwi N

9078 Modified orthodontic treatment of substitution of canines by first premolars: A case report
Li FF, Li M, Li M, Yang X

9087 Renal cell carcinoma presented with a rare case of icteric Stauffer syndrome: A case report
Popov DR, Antonov KA, Atanasova EG, Pentchev CP, Milatkhov LM, Petkova MD, Neykov KG, Nikolov RK

9096 Successful resection of a huge retroperitoneal venous hemangioma: A case report
Qin Y, Qiao P, Guan X, Zeng S, Hu XP, Wang B

9104 Malignant transformation of biliary adenofibroma combined with benign lymphadenopathy mimicking advanced liver carcinoma: A case report
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9112</td>
<td>Congenital hepatic cyst: Eleven case reports</td>
<td>Du CX, Lu CG, Li W, Tang WB</td>
</tr>
<tr>
<td>9121</td>
<td>Endovascular treatment of a ruptured pseudoaneurysm of the internal carotid artery in a patient with nasopharyngeal cancer: A case report</td>
<td>Park JS, Jang HG</td>
</tr>
<tr>
<td>9127</td>
<td>Varicella-zoster virus meningitis after spinal anesthesia: A case report</td>
<td>Lee YW, Yoo B, Lim YH</td>
</tr>
<tr>
<td>9132</td>
<td>Chondrosarcoma of the toe: A case report and literature review</td>
<td>Zhou LB, Zhang HC, Dong ZG, Wang CC</td>
</tr>
<tr>
<td>9142</td>
<td>Tamsulosin-induced life-threatening hypotension in a patient with spinal cord injury: A case report</td>
<td>Lee JY, Lee HS, Park SB, Lee KH</td>
</tr>
<tr>
<td>9148</td>
<td>CCNO mutation as a cause of primary ciliary dyskinesia: A case report</td>
<td>Zhang YY, Lou Y, Yan H, Tang H</td>
</tr>
<tr>
<td>9156</td>
<td>Repeated bacteremia and hepatic cyst infection lasting 3 years following pancreatoduodenectomy: A case report</td>
<td>Zhang K, Zhang HL, Guo JQ, Tu CY, Lv XL, Zhu JD</td>
</tr>
<tr>
<td>9162</td>
<td>Idiopathic cholesterol crystal embolism with atheroembolic renal disease and blue toes syndrome: A case report</td>
<td>Cheng DJ, Li L, Zheng XY, Tang SF</td>
</tr>
<tr>
<td>9168</td>
<td>Systemic lupus erythematosus with visceral varicella: A case report</td>
<td>Zhao J, Tian M</td>
</tr>
</tbody>
</table>

**LETTER TO THE EDITOR**

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9176</td>
<td>Imaging of fibroadenoma: Be careful with imaging follow-up</td>
<td>Ece B, Aydan S</td>
</tr>
</tbody>
</table>
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Retrospective Study

Hospital admissions from alcohol-related acute pancreatitis during the COVID-19 pandemic: A single-centre study

Wai Kin Mak, Davide Di Mauro, Eleanor Pearce, Laura Karran, Aye Myintmo, Jessica Duckworth, Amira Orabi, Rebekah Lane, Sophie Holloway, Antonio Manzelli, Somayyeh Mossadegh

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Abstract

BACKGROUND
The United Kingdom government introduced lockdown restrictions for the first time on 23 March 2020 due to coronavirus disease 2019 (COVID-19) pandemic. These were partially lifted on 15 June and further eased on 4 July. Changes in social behaviour, including increased alcohol consumption were described at the time. However, there were no data available to consider the impact of these changes on the number of alcohol-related disease admissions, specifically alcohol-related acute pancreatitis (AP). This study evaluated the trend of alcohol-related AP admissions at a single centre during the initial COVID-19 lockdown.

AIM
To evaluate the trend in alcohol-related AP admissions at a single centre during the initial COVID-19 lockdown in the United Kingdom.

METHODS
All patients admitted with alcohol-related AP from March to September 2016 to 2020 were considered in this study. Patient demographics, their initial presentation with AP, any recurrent admissions, disease severity and length of stay, were evaluated using ANOVA and \( \chi^2 \) and Kruskal–Wallis tests.

RESULTS
One hundred and thirty-six patients were included in the study. The highest total number of AP admissions was seen in March–September 2019 and the highest single-month period was in March–May 2020. Admissions for first-time presentations of AP were highest in 2020 compared to other year groups and were significantly higher compared to previous years, for example, 2016 ($P < 0.05$). Furthermore, the rate of admissions decreased by 38.89% between March–May 2020 and June–September 2020 ($P < 0.05$), coinciding with the easing of lockdown restrictions. This significant decrease was not observed in the previous year groups during those same time periods. Admissions for recurrent AP were highest in 2019. The median length of hospital stay did not differ between patients from each of the year groups.

CONCLUSION
An increased number of admissions for alcohol-related AP were observed during months when lockdown restrictions were enforced; a fall in figures was noted when restrictions were eased.

Key Words: Alcohol abuse; Alcohol-related acute pancreatitis; COVID-19 pandemic

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Core tip: The coronavirus disease 2019 lockdowns have seen a shift in the population’s social behaviour. Studies have shown an increase in alcohol consumption in the general population over the lockdown period. A retrospective study was performed and observed a rise in alcohol-related pancreatitis admissions during the pandemic. In this context we observed higher admission numbers for alcohol-related pancreatitis during the time when restrictions were in place, and numbers reduced once restrictions were eased.

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INTRODUCTION
Demography and emergent behaviour trends have always affected health and infectious as well as noncommunicable disease[1]. There is a strong link between patterns of alcohol consumption and various noninfectious diseases, including pancreatitis[2]. According to the National Institute for Health and Care Excellence, the incidence of pancreatitis associated with alcohol use is approximately 14 per 100000 per year and is a significant cause of morbidity and mortality in the United Kingdom[3]. In susceptible persons, there is a clear association between the volume and duration of alcohol consumed and the likelihood of developing acute pancreatitis (AP)[4].

The coronavirus disease 2019 (COVID-19) pandemic and subsequent introduction of restrictions on daily life had a profound impact worldwide. In the United Kingdom, lockdown restrictions were first enforced on 23 March 2020. In the months that followed, increased social isolation, psychological distress and a shift in social behaviour (including increased alcohol consumption), were described in medical journals, national surveys[5,6] and in the mainstream media. Although the link between alcohol abuse and AP is well known[2,4], there are no available data as to whether potential changes in alcohol consumption over the lockdown period in the United Kingdom had an impact on incidence of disease. This study evaluated the trend in admissions for alcohol-related AP in a single centre during the first round of lockdown restrictions.

MATERIALS AND METHODS
Ethics
The study was registered and approved by the Royal Devon and Exeter NHS Foundation Trust Governance Board (reference number 20-4628). All patient data were fully anonymised at the time of collection and therefore individual informed consent was not required.
**Context**

In order to reduce COVID-19 transmission, from 23 March 2020, the public were asked to not leave home except for exercise and essential travel. All nonessential retail sector businesses including pubs, bars and accommodation facilities were closed. Restrictions were partially lifted on 15 June and further eased on 4 July, when bars and restaurants reopened.

**Eligibility criteria**

All patients age ≥ 18 years with a confirmed diagnosis of alcohol-related AP during March–September in the five consecutive years (2016–2020) were considered for this study. Cases between October and February, patients aged < 18 years and non-alcohol-related AP were excluded.

**Data collection**

At our Institution, AP is diagnosed in the presence of at least two of the following criteria[7]: Abdominal pain, serum amylase > 450 IU/L and radiological findings of AP. All pancreatitis cases were retrieved using the Trust’s electronic patient record system. A total of 1905 patients with any type of pancreatitis were obtained in the initial search, of which 1769 were coded as other causes of AP and 136 were coded as alcohol related (Figure 1). Patients were divided into 5-year groups (2016–2020). Patients’ demographic data, first presentations of AP, recurrent admissions, disease severity according to the revised Atlanta classification of AP[8] and length of hospital stay were assessed for each year. The period of March–May was of particular interest given that COVID-19 lockdown restrictions occurred during these months in 2020. We compared the number of first presentations and recurrent admissions in March–May and June–September for each year group.

**Statistical analysis**

Statistical analysis was performed using SPSS Statistics version 20 (IBM, Armonk, NY, USA). Continuous variables of a Gaussian distribution were described as mean ± SD. Those that were not normally distributed were given as median and interquartile range (IQR). Categorical data were defined as absolute numbers and percentages. Means were compared using one-way ANOVA. Differences in severity were evaluated with the χ² test. Medians and absolute number of admissions were analysed with the Kruskal–Wallis test. Statistical significance was assessed at the level of P < 0.05.

**RESULTS**

A total of 136 patients were included in the analysis across all 5-year groups. There were 79 male (58%) and 57 female (42%) patients respectively. Mean age was 48 ± 14 years. Age and gender did not differ between the observed year groups (Table 1). When reviewing admission laboratory tests, there were no patients with active severe acute respiratory syndrome coronavirus 2 infection. Analysis of serum biochemistry showed CRP as the only test with a significant difference during the study period (P = 0.000269, Table 2); such a difference may have been coincidental as no correlation was found.

Eighty-nine (65.4%) patients were admitted with their first presentation of AP and 47 (34.6%) were recurrent admissions. The number of monthly (March–September) admissions per year was not consistent between years 2016 and 2020 (P = 0.02215, Table 1). Overall admissions per year was highest in 2019, however admissions for first-time disease onset were highest in 2020 (Table 1, Figure 2). During the lockdown period of March–June 2020, admissions were 38.5% higher than in the same period during 2019 (P = 0.3758), 157.1% higher than in 2018 (P = 0.184), 125% higher than in 2017 (P = 0.07652) and 200% higher than in 2016 (P = 0.04953).

After lockdown restrictions were eased (June–September 2020), there was a 38.89% decrease in first-time admissions compared to March–May 2020 (P = 0.03231). Such a significant decrease was not observed in previous year groups.

There were more cases of recurrent AP in 2019 compared to other year groups and significantly higher compared to 2016 (P = 0.03142, Table 1). Disease severity did not differ among groups (P = 0.92622, Table 1).

The overall median hospital stay was 4 d (IQR 2–6.25), with no significant difference between the years observed (P = 0.540317, Table 1). Median length of stay was 3 d in 2020, 4 in 2019, 3 in 2018, 4.5 in 2017, and 4.5 in 2016 (P = 0.540317, Table 1).

**DISCUSSION**

Since COVID-19 lockdown restrictions were first introduced in March 2020, both positive and negative behavioural changes related to alcohol consumption have been reported in the medical literature[6,9, 10]. According to the results of one national survey, up to one-third of regular drinkers stated they had cut down or even stopped drinking altogether during the pandemic[11], while one in five had increased
Table 1 Patients’ data and admissions from March to September 2016–2020

<table>
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<tr>
<td>M</td>
<td>9</td>
<td>18</td>
<td>19</td>
<td>21</td>
<td>14</td>
<td>0.037262</td>
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<tr>
<td>F</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>17</td>
<td>22</td>
<td></td>
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<tr>
<td>Mean age ± SD (range)</td>
<td>52.0 ± 19.344 (30-87)</td>
<td>47.0 ± 14.794 (19-77)</td>
<td>45.0 ± 12.966 (25-67)</td>
<td>46.0 ± 13.440 (25-74)</td>
<td>52.0 ± 12.776 (26-85)</td>
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<td>Total admission</td>
<td>12</td>
<td>24</td>
<td>26</td>
<td>38</td>
<td>36</td>
<td></td>
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<tr>
<td>First onset AP</td>
<td>11</td>
<td>22</td>
<td>15</td>
<td>26</td>
<td>29</td>
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<tr>
<td>Recurrent AP</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>12</td>
<td>7</td>
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<tr>
<td>Total admission</td>
<td>12</td>
<td>24</td>
<td>26</td>
<td>38</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>March-May</td>
<td>6</td>
<td>8</td>
<td>14</td>
<td>15</td>
<td>21</td>
<td>0.1657</td>
</tr>
<tr>
<td>June-September</td>
<td>6</td>
<td>16</td>
<td>12</td>
<td>23</td>
<td>15</td>
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</tr>
<tr>
<td>First onset AP</td>
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<td>22</td>
<td>15</td>
<td>26</td>
<td>29</td>
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<tr>
<td>March-May</td>
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<td>7</td>
<td>13</td>
<td>18</td>
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<tr>
<td>June-September</td>
<td>5</td>
<td>14</td>
<td>8</td>
<td>13</td>
<td>11</td>
<td></td>
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<tr>
<td>Disease severity (n)</td>
<td></td>
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<td></td>
<td></td>
<td>0.92622</td>
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<tr>
<td>Mild</td>
<td>8</td>
<td>16</td>
<td>17</td>
<td>29</td>
<td>25</td>
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<tr>
<td>Moderate</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>9</td>
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<tr>
<td>Severe</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Median hospital stay (IQR)</td>
<td>4.5 (2.0; 7.0)</td>
<td>4.5 (3.0; 9.0)</td>
<td>3.00 (1.25; 5.75)</td>
<td>4 (2; 6)</td>
<td>3.00 (2.00; 5.25)</td>
<td>0.540317</td>
</tr>
</tbody>
</table>

*Kruskal–Wallis test.
AP: Acute pancreatitis; IQR: Interquartile range.

Table 2 Serum biochemistry results 2016–2020

<table>
<thead>
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<th>Median parameter (IQR)</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>Overall P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creatinine</td>
<td>55.0 (50.5, 57.0)</td>
<td>61.5 (51.5, 72.5)</td>
<td>57.5 (54.0, 65.5)</td>
<td>62 (53, 82)</td>
<td>60.0 (54.0, 76.5)</td>
<td>0.61261</td>
</tr>
<tr>
<td>eGFR</td>
<td>90 (90, 90)</td>
<td>90 (90, 90)</td>
<td>90 (90, 90)</td>
<td>90 (90, 90)</td>
<td>90.0 (89.5, 90.0)</td>
<td>0.447051</td>
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<tr>
<td>CRP</td>
<td>45.5 (15.0, 185.0)</td>
<td>57.50 (19.0, 212.75)</td>
<td>65.0 (6.75, 93.00)</td>
<td>6.0 (1.0, 30.5)</td>
<td>6.50 (3.25, 13.75)</td>
<td>0.00026951</td>
</tr>
<tr>
<td>Hb</td>
<td>133 (125, 143)</td>
<td>132.5 (125, 146.5)</td>
<td>145.0 (136.0, 151.5)</td>
<td>149 (136, 159)</td>
<td>138.0 (127.5, 147.0)</td>
<td>0.083811</td>
</tr>
<tr>
<td>White cell count</td>
<td>7.00 (5.95, 11.70)</td>
<td>12.05 (9.35, 14.45)</td>
<td>10.30 (6.875, 15.35)</td>
<td>10.2 (6.2, 13.0)</td>
<td>10.7 (7.8, 12.4)</td>
<td>0.21831</td>
</tr>
<tr>
<td>Amylase</td>
<td>286.0 (112.25, 650.00)</td>
<td>158 (103, 520)</td>
<td>242.0 (204.0, 463.75)</td>
<td>254 (137, 433)</td>
<td>382.0 (102.5, 613.5)</td>
<td>0.84971</td>
</tr>
</tbody>
</table>

*Kruskal–Wallis test.
IQR: Interquartile range; eGFR: Epidermal growth factor receptor; CRP: C-reactive protein.

their drinking to potentially more harmful levels[12]. Since the risk of misuse is higher in people previously or currently known to have abused alcohol[9,11,13], it has been hypothesised that psychological stress, social isolation and reduced access to addiction support services during lockdown may have contributed to this behaviour[9]. Moreover, national retail sales of alcohol for private consumption (when pubs and restaurants were closed) rose by £160 million in April 2020 compared to the same time period in 2019, indicating that alcohol consumption may have increased during this time[14]. To the best of our knowledge, there are no available data on the impact of alcohol abuse on the trend of hospital admissions for alcohol-related AP during the COVID-19 pandemic. In our study, the highest number of overall admissions (both first presentations and recurrent admissions) between March and September occurred in 2019; single-month figures and the number of first-presentations alone were highest during March–May 2020, corresponding with the beginning of lockdown restrictions. The number of admissions significantly decreased between June and September of the same year when lockdown restrictions eased. Comparing the same time periods (March–May and June–September) in 2016–2019, the number of overall AP admissions were more consistent between these two periods. None
of the patients admitted in 2020 had COVID-19, therefore it was not possible to speculate on the possible role of the infection on the onset of AP and admission rates. Nevertheless, it could be hypothesised that this corresponded with a decrease in alcohol consumption, as social isolation lessened and access to specialist services once again became more readily available.

Admissions for recurrent AP followed a different pattern, as overall figures were highest in 2019 and no difference in monthly admissions was observed throughout the 5-year study period. The analysis of our data could not explain such a result. There were a greater number of first presentations of AP in 2020 compared to 2019, while overall recurrent cases were higher in 2019. When examining March–May (lockdown period), the overall admissions and first presentations of AP in 2020 outweighed those of 2019.

This study was potentially limited by the short timeframe of data collection and a small cohort of patients. Moreover, assumptions have been made about alcohol consumption among a local population based on national statistics; this may have resulted in ecological fallacy. If this research were to be expanded nationally, this may allow data collection from a larger group of individuals and would avoid bias based on the behaviour of one local population.

CONCLUSION

An increased number of admissions for alcohol-related AP was observed at our centre during the months when COVID-19 lockdown restrictions were enforced, and the numbers decreased in correlation with the easing of restrictions. Follow-up studies looking at the epidemiology of postpandemic drinking habits and alcohol-related AP admission rates would allow better understanding of the effects of COVID-19 on alcohol-related AP. This could also potentially inform how community support could be improved for this group of patients.
ARTICLE HIGHLIGHTS

Research background
In order to combat the coronavirus disease 2019 (COVID-19) pandemic, one strategy was the introduction of social isolation also known as lockdown restrictions. In the United Kingdom, the first set of restrictions was put in place in March and partially lifted in June 2020.

Research motivation
There are currently no data on the impact of alcohol abuse on the trend of hospital admissions for alcohol-related acute pancreatitis (AP) during the COVID-19 pandemic.

Research objectives
To evaluate the trend in alcohol-related AP admissions during the first COVID-19 lockdown period.

Research methods

Research results
During the lockdown period of March–June 2020, admissions were 38.5% higher than in 2019. A 38.89% reduction was observed following the easing of restrictions.

Research conclusions
An increased number of admissions for alcohol-related AP was observed during lockdown, with cases falling following the easing of restrictions. Follow-up studies are required to better understand the effects of COVID-19 on alcohol-related AP.

Research perspectives
Follow-up studies looking at the epidemiology of postpandemic drinking habits and alcohol-related AP admission rates would allow better understanding of the effects of COVID-19 on alcohol-related AP. This could also potentially inform how community support could be improved for this group of patients.

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FOOTNOTES

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Institutional review board statement: The study has been registered and approved by the Royal Devon and Exeter NHS Foundation Trust Governance Board-reference number 20-4628.

Informed consent statement: All patient data was fully anonymized at the time of collection and therefore individual informed consent was not required.

Conflict-of-interest statement: There are no conflicts of interest to report.

Data sharing statement: The dataset analysed during the current study is not publicly available, in accordance with the Confidentiality Policy in force at the Royal Devon and Exeter NHS Foundation Trust; this is a legal requirement under the Data Protection Act 2018 (United Kingdom). Data are available from the corresponding author on reasonable request.

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