

Review

SARS-CoV-2-Related Parotitis in Children: A Narrative-Focused Review

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Abstract: The COVID-19 pandemic has revealed a diverse spectrum of clinical manifestations in the pediatric population, including the rare but notable presentation of unilateral parotitis. This comprehensive review explores the complexities surrounding SARS-CoV-2-associated unilateral parotitis in children. It addresses the initial clinical presentation, diagnostic challenges, treatment strategies, and the wider epidemiological impacts of this unusual symptom. The review synthesizes the available literature, providing insights into the pathophysiological mechanisms underlying this atypical manifestation and its implications for pediatric healthcare during the pandemic. Through the rigorous analysis of reported cases, this study underscores the need for increased awareness and a broad differential diagnosis among clinicians. It also emphasizes the importance of continued research to delineate the full clinical spectrum of COVID-19 in children.

Keywords: SARS-CoV-2; parotitis; pediatrics; SARS-CoV-2 parotitis; atypical COVID-19; COVID-19 in children



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1. Introduction

The advent of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has led to a global health emergency unprecedented in modern times. As of May 2024, global statistics for COVID-19 show more than 774 million confirmed cases and over 7 million deaths worldwide [1,2]. As of the latest data available in May 2024, Europe has recorded approximately 43,192,122 COVID-19 cases and 384,000 deaths due to the virus [3,4]. Initially characterized as a primary respiratory pathogen, the virus responsible for the coronavirus disease 2019 (COVID-19) has since been implicated in a myriad of clinical symptoms affecting multiple organ and systems [5,6]. The scientific community has continuously updated its understanding of the disease, adapting to its evolving epidemiology and clinical presentation [7]. The MPIDR COVerAGE database reported that 0.4% of COVID-19 deaths (over 17,400) occurred in children and adolescents under 20 years of age. Of these deaths, 53% occurred in adolescents ages 10–19 and 47% in children ages 0–9 [8]. Children, initially

thought to be largely spared by the virus with minimal or asymptomatic presentations, have begun to show a wider range of clinical manifestations, including some severe and atypical [9,10]. An uncommon but cumbersome clinical presentation associated with SARS-CoV-2 infection in children is unilateral parotitis, which is the inflammation of a single parotid gland [6,7]. Unilateral parotitis is a relatively rare manifestation, particularly in the pediatric population [11,12]. Historically, unilateral parotitis in children has been primarily linked to the mumps virus, a well-known cause of salivary gland inflammation [13]. The parotid glands are a pair of salivary glands positioned in front of the ears, and their involvement in infectious processes can lead to characteristic swelling and discomfort, together with fever and malaise. Interestingly, the clinical presentation of SARS-CoV-2-associated parotitis appears to differ between children and adults. While adult COVID-19 patients have been reported to develop parotitis, it is more commonly observed as a bilateral involvement of the salivary glands [14]. In contrast, the cases documented in the pediatric population have predominantly featured unilateral parotitis, with only one gland affected [6,7]. This atypical unilateral pattern can pose diagnostic challenges, as it may initially raise the suspicion of other etiologies, infectious (mumps) or not (lithiasis, inflammatory diseases). However, in the context of the ongoing COVID-19 pandemic, clinicians are increasingly encountering cases where SARS-CoV-2 seems to be the underlying cause of unilateral parotitis, presenting unique diagnostic and therapeutic dilemmas [15]. The emergence of this atypical presentation of SARS-CoV-2 infection in children has sparked significant interest and raised important questions about the virus's tropism and its ability to target glandular tissues. Understanding the pathophysiological mechanisms behind SARS-CoV-2-induced parotitis could provide valuable insights into the multisystemic nature of the disease and its diverse clinical manifestations. This review aims to explore the complexities of unilateral parotitis associated with SARS-CoV-2 in children, addressing the initial clinical presentation, diagnostic challenges, treatment strategies, and the wider epidemiological impacts of this unusual manifestation. It also evaluates how the emerging evidence of SARS-CoV-2-related parotitis fits into the existing knowledge of COVID-19 in the pediatric population. Given the relatively recent identification of this association, the review highlights the need for ongoing research and the potential for new insights that could reshape the approaches to pediatric healthcare during the pandemic. Identifying the underlying causes of parotitis in the COVID-19 era is crucial, as it has implications for diagnosis, management, and the overall understanding of the virus's pathogenesis.

The significance of exploring unilateral parotitis associated with SARS-CoV-2 in children extends beyond the immediate clinical implications. This atypical manifestation not only challenges the conventional understanding of COVID-19's impact on pediatric patients but also underscores the virus's capacity for causing a diverse range of symptoms. Studying this particular symptom is crucial for several reasons: it aids in refining differential diagnoses in pediatrics—where symptoms often overlap with other common pediatric conditions; enhances our understanding of the virus's mechanisms of action, particularly how it affects glandular tissues; and informs more nuanced public health guidelines that can better protect children during and beyond the current pandemic.

This focus is particularly pertinent given the initially overlooked severity of COVID-19 symptoms in children during the early stages of the pandemic. As the global health community gains more insight into the pediatric impact of the virus, it becomes increasingly important to document and analyze even the rarest symptoms. Doing so not only helps in managing the current pandemic more effectively but also prepares us for future outbreaks with similar pathogens.

2. Materials and Methods

To conduct a comprehensive review of the literature on unilateral parotitis associated with SARS-CoV-2 in children, a systematic search was executed using several key biomedical databases. These included PubMed, MEDLINE, EMBASE, Scopus, and Web of Science. The search was tailored to capture all relevant studies published up to April 2024. The

search terms were strategically combined using Boolean operators to cover various aspects of the study focus. The primary search terms included combinations of the following:

'COVID-19' OR 'SARS-CoV-2';
'Parotitis' OR 'Salivary Gland Infection';
'Pediatrics' OR 'Children'.

These terms were used in conjunction with filters to narrow the results to studies pertinent to our research questions. We specifically looked for articles published in English, involving pediatric patients (0–18 years), and focusing on clinical cases or cohort studies reporting on unilateral parotitis.

Inclusion criteria:

Studies involving children diagnosed with COVID-19;
Studies reporting cases of unilateral parotitis;
Peer-reviewed articles and case reports.

Exclusion criteria:

Studies focusing solely on adult populations;
Literature reviews and commentaries without original data;
Studies reporting only on bilateral parotitis or other salivary gland diseases not associated with SARS-CoV-2.

The initial search yielded a total of 250 potential articles. After screening titles and abstracts for relevance, 75 articles were retained for full-text review. Of these, 15 met all the inclusion criteria and were included in the final synthesis. This process is visually summarized in a PRISMA flow diagram (Figure 1), which details the number of studies screened, assessed for eligibility, and included in the review, providing complete transparency of the search process and study selection.

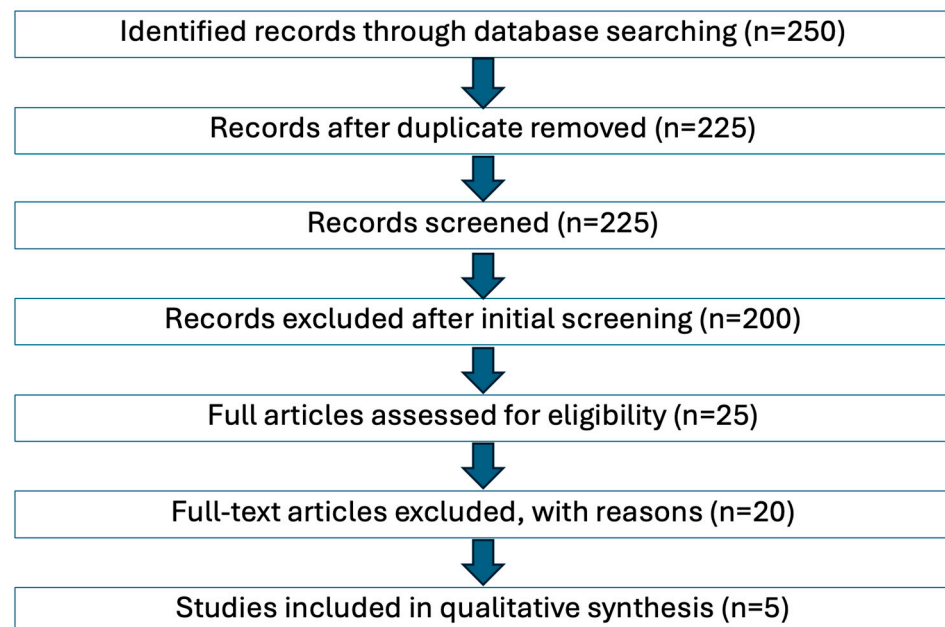


Figure 1. Flow diagram highlighting the search process and study selection.

From the eligible studies, data on multiple parameters were extracted, including patient demographics (age, sex, geographical location), clinical presentation (symptoms, duration of illness), diagnostic evaluations (laboratory tests, imaging studies), treatments administered, and patient outcomes. Special attention was given to the details of the diagnostic process, including the type of SARS-CoV-2 testing used and the imaging characteristics observed in cases of parotitis associated with the virus. Patient demographics and clinical presentations were summarized to identify common patterns and variations.

Diagnostic evaluations were analyzed to understand the range of methodologies employed and their respective findings in the context of SARS-CoV-2-associated parotitis. Treatment strategies were compiled and assessed based on the reported efficacy and patient outcomes.

3. Results

As regards clinical data, we ultimately included the same five studies that we already discussed in our published case report about a COVID-19-associated parotitis in children, which represent the only available data regarding the subject [16].

They were all published in the last seventeen years. Collectively, the five studies reported on seven pediatric cases of unilateral parotitis linked to SARS-CoV-2 infection. Given the exploratory nature of this review and the scarcity of extensive quantitative data, a statistical analysis was not performed. Instead, the review focused on synthesizing qualitative insights and compiling descriptive accounts of clinical presentations, diagnostic approaches, and treatment outcomes.

The affected children ranged in age from 2 months to 12 years, with a median age of 4 years. The study cohort was composed of 4 male and 3 female patients. The clinical manifestations of the SARS-CoV-2-induced parotitis were characterized by a common set of symptoms, including unilateral facial swelling, pain, and tenderness over the affected parotid gland. In some instances, additional symptoms, such as decreased appetite, fever, and difficulty swallowing, were also reported. Laboratory investigations revealed elevated markers of inflammation, including C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and amylase levels, in the majority of the cases. Importantly, all of the included studies confirmed the presence of SARS-CoV-2 infection through positive polymerase chain reaction (PCR) testing. However, the respiratory symptoms associated with COVID-19 were variable, with some patients presenting with mild cough or rhinorrhea, while others had no overt respiratory manifestations. The management of these cases typically involved the use of anti-inflammatory medications, such as ibuprofen or corticosteroids (prednisone or methylprednisolone). The duration of treatment ranged from 3 to 7 days, and all patients ultimately experienced the complete resolution of their parotitis symptoms.

3.1. SARS-CoV-2 Infection and Its Impact on the Pediatric Population

The COVID-19 pandemic has had a significant impact on the pediatric population, manifesting both direct and indirect effects that have been evolving. Initially, it seemed that children were relatively shielded from severe outcomes of SARS-CoV-2 infection. However, subsequent studies have unveiled a broader and more complex spectrum of impacts affecting children's physical health, mental well-being, and their social and educational development [17,18].

In terms of physical health, SARS-CoV-2 infects children across all pediatric age groups, commonly presenting symptoms such as fever (reported in 56% of cases) and cough (reported in 54% of cases) [19]. However, the severity and presentation can vary significantly with age. While a significant number of children experience mild to moderate symptoms [20,21] infants under one year of age are at a higher risk of developing severe conditions and often present with vomiting—a symptom less common in other age groups [22,23]. Conversely, children exhibit lower rates of fever and cough compared to adults and typically experience a milder course of the illness, potentially due to fewer comorbid conditions and differences in immune system responses [18,20,24,25]. As the pandemic progresses, researchers and clinicians confront the varied manifestations of SARS-CoV-2 infection [26,27]. For example, a large cohort study found that about 8% of children with COVID-19 developed gastrointestinal symptoms such as diarrhea and vomiting, and about 4% presented with neurological symptoms such as headaches and seizures [1,28,29]. Its impact on pediatric populations is particularly puzzling, with symptoms ranging from the well-recognized multisystem inflammatory syndrome in children (MIS-C), which affects about 2 in 100,000 children [30], to less common conditions like parotitis [14,18,31]. Furthermore, the pandemic has exacerbated mental health issues among children, with a

significant increase in anxiety and depression reported in over 25% of pediatric patients studied [32]. The closure of schools and the shift to remote learning have also impacted children's social skills and academic performance, with some studies indicating a regression in literacy and numeracy skills among young learners [33].

Overall, while children may generally experience a milder course of COVID-19 compared to adults, the varied and sometimes severe manifestations of the virus in this population underscore the need for ongoing vigilance and research to fully understand and mitigate these impacts.

3.2. Patients' Demographics and Clinical Presentation

Patient demographics in reported cases have been diverse, with varying ages and backgrounds [34,35]. The disease presents with the recurrent swelling of one, and occasionally both, parotid glands, lasting for a few days up to a week with asymptomatic periods between episodes. The age range of affected children typically spans from 3 to 12 years, although it has been noted in children as young as 6 months [36], highlighting susceptibility across early childhood to preadolescence. Notably, there does not seem to be a strong preference for either gender in affected cases. The clinical presentation of COVID-19-related unilateral parotitis has been both surprising and challenging, often mimicking other infections and leading to diagnostic uncertainties [35]. Clinically, children often experience an acute onset of unilateral swelling of the parotid gland, which is the largest of the salivary glands. This swelling manifests rapidly, causing concern due to its visibility and the discomfort it induces. Typically, patients may present with fever and localized erythema in the affected parotid gland, with tenderness upon palpation [37]. Some children may also experience dysphagia, which can be distressing, particularly in younger individuals who may struggle to articulate their symptoms effectively. Additionally, patients may report recent upper respiratory tract symptoms preceding the development of parotitis, hinting at a possible prodrome to the condition. The examination should encompass scrutiny for any skin alterations, the evaluation of facial symmetry, and the assessment of facial nerve function. Additionally, the bimanual palpation of the gland is recommended. While saliva from Stensen's duct usually lacks suppuration, there is evidence suggesting it may contain plaque-like mucopus plugs [38]. During clinical examination, consideration of atypical features can prompt evaluation for alternative causes. Perinatal swelling may indicate congenital lesions like lymphovascular malformations, while progressive painless parotid masses could suggest neoplasms, particularly in older children; signs of trauma to the buccal mucosa and dental causes should also be assessed. Furthermore, a common theme is the absence of significant prior medical history suggests a direct correlation between the viral infection and the onset of parotitis, rather than an opportunistic complication in already immunocompromised individuals.

3.3. Unilateral Parotitis SARS-CoV-2-Related: Pathogenetic Mechanisms

The incidence of unilateral parotitis in the context of COVID-19 has brought forth numerous questions about the virus's transmission dynamics and tropism for glandular tissue [16,39]. Understanding this unusual presentation is critical, as it has implications for the diagnosis, management, and isolation of affected individuals, and it also provides insights into the pathophysiology of the virus [40]. The occurrence of parotitis in SARS-CoV-2 infections can be explained by various interconnected pathological mechanisms [34,41]. The angiotensin-converting enzyme 2 (ACE2) receptor, crucial for viral entry into host cells, is present in various body tissues, including salivary gland ducts, hinting at a potential pathway for viral-induced parotitis. Direct viral invasion is a leading hypothesis, as SARS-CoV-2 binds to ACE2 receptors on salivary gland epithelium, resulting in local inflammation and cellular damage [42]. Simultaneously, the host's immune response, while fighting the virus, may overreact, triggering a harmful 'cytokine storm' with excessive cytokine release, further inflaming tissues and swelling glands. Additionally, SARS-CoV-2 disrupts endothelial cells, leading to increased vascular permeability and edema, which can

promote parotitis. The virus's tendency to induce a hypercoagulable state might also result in microthrombi formation in the salivary glands' small blood vessels, hampering blood flow and exacerbating inflammation (Figure 2) [43]. Furthermore, the concept of molecular mimicry may shed light on prolonged or recurrent gland inflammation [9]. Hence, the immune system's production of antibodies against the virus might unintentionally target structurally similar antigens within the salivary glands [44]. This intricate interplay of direct viral effects, immune response dysregulation, vascular pathology, and autoimmune phenomena not only clarifies the occurrence of parotitis in COVID-19 but also underscores the multisystemic impact of SARS-CoV-2 [45]. Therefore, it is essential to reassess clinical protocols and recognize SARS-CoV-2 as a potential cause of glandular inflammation in the clinical management of these patients. This development also holds significant importance for epidemiological tracking and modelling, as the presence of atypical symptoms may lead to the under-recognition of the disease, contributing to the silent spread of the virus in communities.

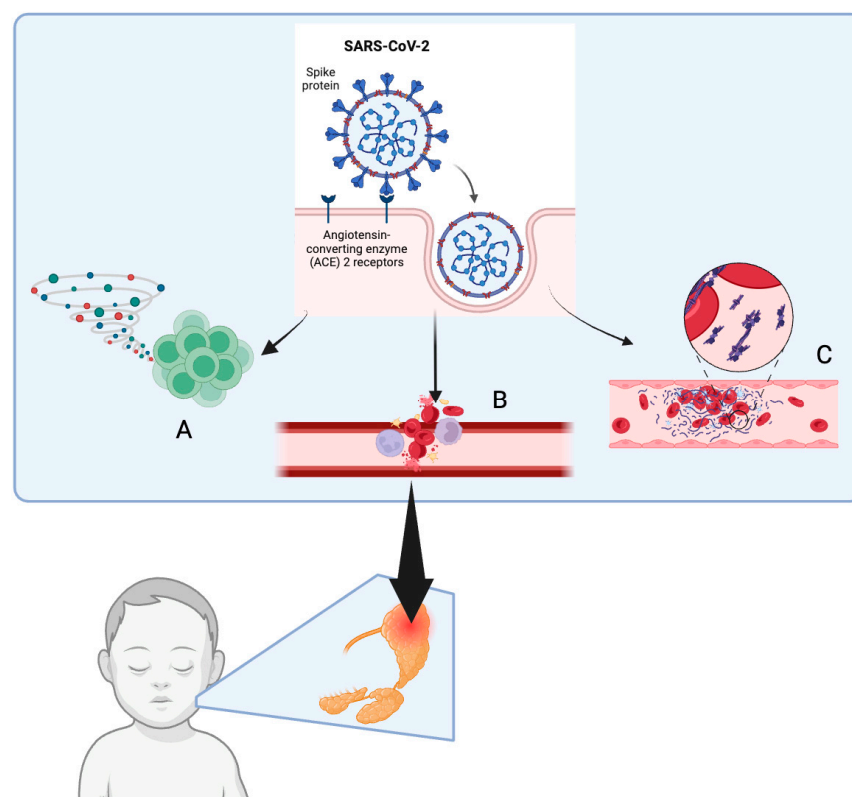


Figure 2. SARS-CoV-2-related parotitis pathogenetic mechanisms. After entering the parotid gland cells, SARS-CoV-2 may cause (A) a cytokine storm with hyperinflammation; (B) increased vascular permeability and edema; and (C) microthrombi formation in the salivary glands' small blood vessels (created with [Biorender.com](https://www.biorender.com) (accessed on 30 May 2024)).

3.4. Clinical Management, Imaging Findings, and Differential Diagnosis

The diverse presentation of the disease highlights the necessity of conducting a comprehensive assessment of symptoms, laboratory examinations, and imaging results to distinguish SARS-CoV-2-induced parotitis from other potential causes [41]. The diagnostic approach is tailored according to the stage of presentation. The diagnostic process typically involves a comprehensive respiratory panel to identify common respiratory pathogens, such as influenza viruses and bacteria, which may present with similar symptoms [43]. Specifically, SARS-CoV-2 specific RT-PCR swab tests are promptly administered given the clinical presentation and the ongoing pandemic [46]. Serology tests are also conducted to exclude other infections like mumps and the Epstein–Barr virus [47]. Blood tests often

reveal normal or slightly elevated white blood cell counts, which may not indicate bacterial infection. However, an increase in C-reactive protein (CRP) levels, an acute-phase reactant, may suggest inflammation or infection. The definitive confirmation of SARS-CoV-2 infection relies on positive results from RT-PCR tests [48]. Multiple modalities have been considered for the investigation of unilateral parotitis including ultrasonography, sialography, computer tomography and magnetic resonance imaging. Ultrasound imaging is a key diagnostic tool, typically revealing an enlarged parotid gland showing increased vascularity [13,36,49,50]. Importantly, there is no evidence of abscess formation, calculi, or neoplastic processes, which are indicative of other pathologies like bacterial sialadenitis or obstructive conditions. It is important to assess the etiology and consider various potential diagnosis. Elevated white cell counts and C-reactive protein levels may indicate the presence of an infectious agent or secondary infection. Additionally, serological markers, particularly for mumps, should be conducted, especially if it is the initial episode. Other infections, such as *Bartonella henselae* and actinomycosis, can mimic a similar clinical presentation. The role of serum amylase measurement remains controversial, as while elevated serum amylase levels may suggest parotitis, normal serum amylase levels do not exclude the diagnosis. Mumps and bacterial infections are ruled out systematically based on the combination of negative serology and the absence of bacterial growth in cultures taken from parotid secretions, if applicable.

3.5. Treatment Strategies and Clinical Outcomes

The management of SARS-CoV-2-associated parotitis in the pediatric population is primarily focused on alleviating symptoms, as there is no specific antiviral treatment targeting the parotitis caused by the virus [51]. When addressing this condition in children, healthcare providers typically recommend the use of nonsteroidal anti-inflammatory drugs (NSAIDs). These medications are effective in managing the discomfort and pain that comes with parotitis and can also help to decrease the swelling of the affected gland. While NSAIDs serve as the frontline approach, the use of antibiotics is not a standard part of the treatment protocol for viral-induced parotitis. However, in instances where a secondary bacterial infection is suspected due to additional symptoms or clinical evidence, antibiotics may be prescribed. It is important to differentiate between primary viral parotitis and secondary bacterial infections to avoid the unnecessary use of antibiotics, which can lead to antibiotic resistance and other complications. Corticosteroids, which are known for their potent anti-inflammatory effects, are not typically employed in the treatment of SARS-CoV-2-associated parotitis unless there is a compelling reason. Such indications might include severe inflammation that does not respond to other treatments or complications that would benefit from the immunosuppressive effects of corticosteroids. The prognosis for children with parotitis related to COVID-19 is generally good [36,49,50,52]. Most patients experience significant improvement within a week after the initial presentation of symptoms. This improvement is characterized by a reduction in pain, a decrease in the swelling of the parotid gland, and an overall return to normal function and well-being. Nonetheless, follow-up care is an important aspect of managing this condition. Monitoring the patient post-recovery allows for the early detection and management of any recurrence, which is uncommon but can occur. Additionally, follow-up visits provide an opportunity to check for any long-term effects of the infection. While long-term sequelae from viral parotitis are rare, tracking them can yield insights that contribute to a deeper understanding of the virus's impact on children and inform future treatment approaches. Figure 3 shows the algorithm proposed by the authors for the management of unilateral parotitis in pediatric SARS-CoV-2 cases.

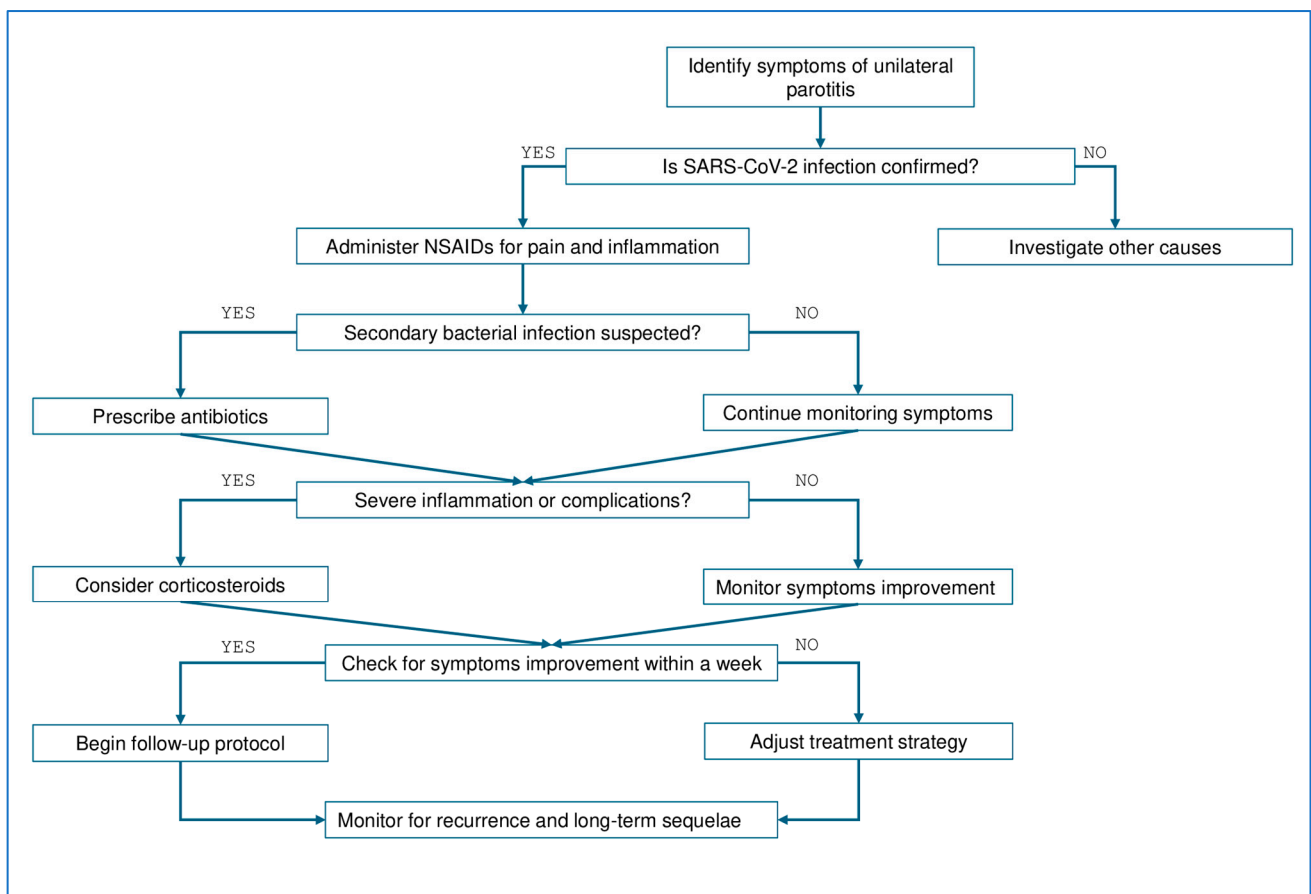


Figure 3. Management of unilateral parotitis in pediatric SARS-CoV-2 cases.

3.6. Epidemiological Context and Implications for Pediatric Healthcare

Unilateral parotitis, an inflammation of one parotid gland, has emerged as an atypical symptom in children with SARS-CoV-2, albeit infrequently when compared to the more common respiratory symptoms associated with the disease. This condition adds complexity to the already diverse clinical presentation of COVID-19 and suggests that the virus’s impact on pediatric populations may be broader than initially understood [53]. Given the infrequent nature of unilateral parotitis as a manifestation of COVID-19 in the pediatric demographic, its incidence is not well documented, which likely leads to a significant underrepresentation in epidemiological data [22]. The reasons for this underreporting are multifaceted. For one, the mild or asymptomatic course of SARS-CoV-2 in children means that they might not always be brought in for medical evaluation, especially if the symptoms do not align with the well-known signs of the disease. Additionally, primary care physicians and pediatricians may not routinely test for SARS-CoV-2 in cases of parotitis unless there is a high index of suspicion or known exposure, given the prevalence of other etiologies for parotitis such as mumps or bacterial infections [54]. This underreporting has implications for public health monitoring and disease control efforts (Figure 4). Accurate epidemiological tracking relies on the recognition and documentation of all symptoms related to a disease, not just the most common or severe ones. Without acknowledging the full range of possible presentations, including those as rare as unilateral parotitis, health authorities may not have a complete understanding of transmission patterns, leading to gaps in containment strategies. For clinicians, these fewer common presentations necessitate a broad diagnostic approach during the pandemic. The inclusion of SARS-CoV-2 in the differential diagnosis for pediatric parotitis is essential to ensure prompt and appropriate patient management, including isolation to prevent transmission and tailored treatment strategies. This requires an increased awareness among healthcare providers of COVID-19’s

varied clinical manifestations. The recognition of such atypical symptoms is also a call to action for researchers. To delineate the true clinical spectrum of COVID-19 in children, comprehensive studies are needed. These should aim not only to document the prevalence of unusual presentations like unilateral parotitis but also to explore the mechanisms by which SARS-CoV-2 can lead to such symptoms. Understanding these pathways may reveal insights into the virus’s behavior and its interaction with the immune system of younger populations. The occurrence of atypical manifestations such as unilateral parotitis during the COVID-19 pandemic presents complex challenges for public health initiatives. Such presentations can complicate diagnostic efforts, potentially delaying appropriate isolation and treatment measures. The role of children in the transmission dynamics of SARS-CoV-2 is not fully understood, and these atypical cases underscore the need for continued vigilance and a comprehensive approach to testing and management. For healthcare professionals, these observations underscore the critical importance of maintaining a broad differential diagnosis when treating pediatric patients in the context of the pandemic. The early detection and management of cases like these are imperative for improving patient outcomes and ensuring public health safety.

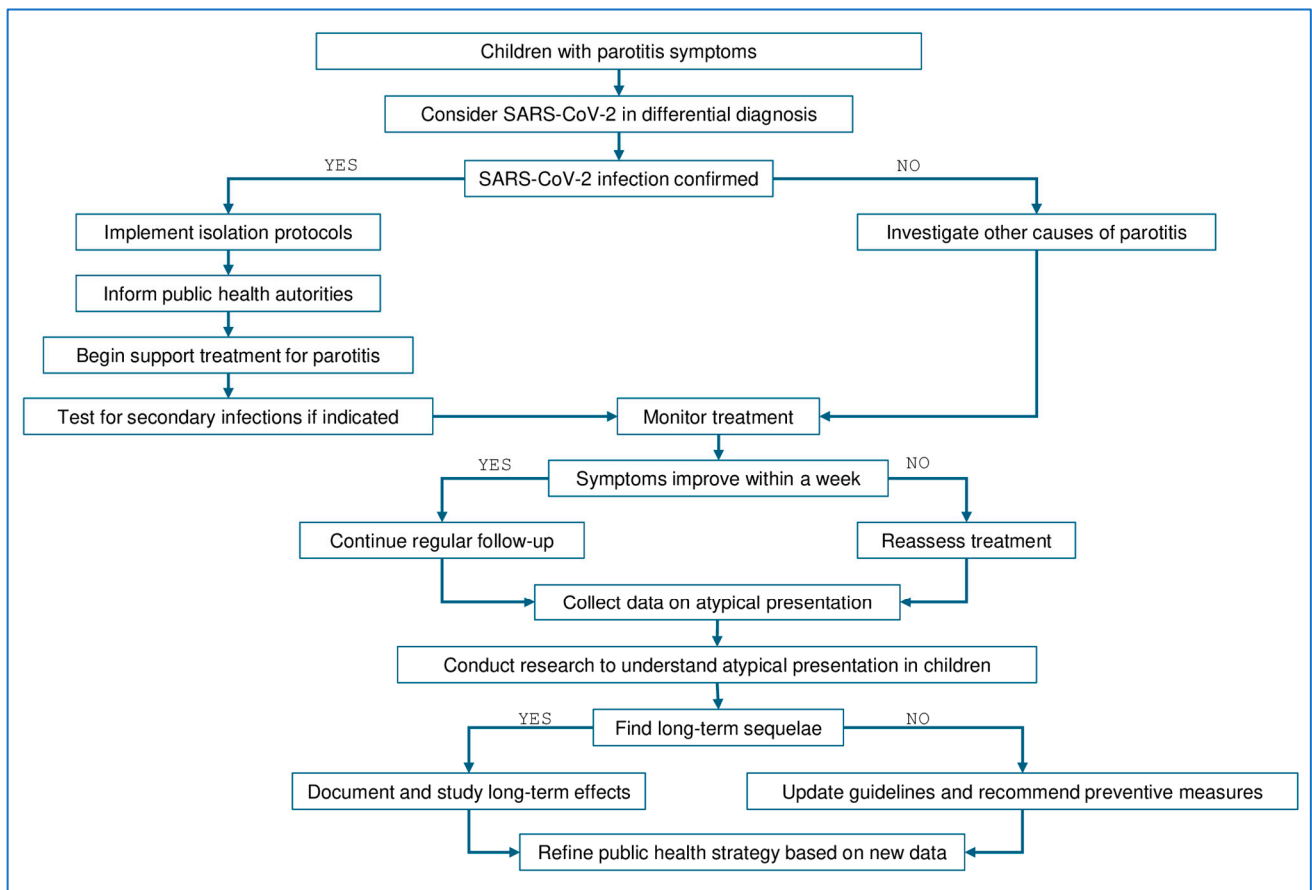


Figure 4. Public health and pediatric implications of SARS-CoV-2-associated unilateral parotitis.

This review has synthesized the available literature on unilateral parotitis in children associated with SARS-CoV-2, presenting a focused examination of the clinical presentations, diagnostics, and management strategies. The strengths of this review lie in its rigorous and methodical approach to selecting and reviewing the literature, which ensures a comprehensive understanding of this rare but significant clinical manifestation.

3.6.1. Strengths

Comprehensive Literature Search: The review utilized a broad range of databases to ensure a thorough capture of relevant studies, minimizing publication bias.

Focused Review Scope: By concentrating specifically on unilateral parotitis associated with COVID-19 in pediatric patients, this review addresses a clear gap in the existing literature, providing valuable insights for pediatric healthcare providers.

3.6.2. Limitations

Limited Data Availability: One of the primary limitations of this review is the small number of studies available, which inherently restricts the ability to perform statistical analysis and draw broader epidemiological conclusions.

Predominantly Case Reports and Small Series: The included studies are mostly case reports and small series, which, while providing detailed clinical insights, do not offer the level of evidence that larger cohort or randomized controlled trials would provide.

Variability in Report Quality: There is considerable variability in the detail and quality of the reports reviewed, which may affect the generalizability of the findings.

Potential Publication Bias: Despite efforts to minimize it, there is always the possibility of publication bias, where only cases with significant outcomes are reported.

This review highlights the need for ongoing research into SARS-CoV-2-associated unilateral parotitis in children, advocating for more robust, multicenter studies that can provide higher quality evidence and more definitive guidance for clinical practice

4. Conclusions

This review has critically examined the occurrence and management of unilateral parotitis in children as a rare manifestation of SARS-CoV-2 infection. The synthesis of the limited available studies highlights that while rare, unilateral parotitis is a clinically significant condition that can pose diagnostic challenges and requires heightened awareness among clinicians.

4.1. Key Findings

- (i) **Clinical Presentation and Diagnosis:** Unilateral parotitis associated with COVID-19 in children typically presents with acute onset of facial swelling, pain, and tenderness over the affected parotid gland. Diagnosis primarily relies on clinical examination and confirmation of SARS-CoV-2 infection.
- (ii) **Treatment and Management:** The treatment mainly involves supportive care with anti-inflammatory medications. The absence of specific antiviral treatments for this symptom underscores the importance of supportive and symptomatic management.

4.2. Implications for Clinical Practice and Public Health

The findings from this review should prompt pediatric healthcare providers to consider COVID-19 in the differential diagnosis of unilateral parotitis, even in the absence of typical respiratory symptoms. The increased recognition of this condition will enable timely and appropriate management, reducing the potential for complications. Furthermore, public health strategies should include the dissemination of information about atypical presentations of COVID-19 to educate healthcare providers and improve surveillance.

4.3. Future Research Directions

There is a clear need for further research into the pathophysiology of SARS-CoV-2 as it relates to its effects on the salivary glands. Prospective studies and larger cohort studies are necessary to understand the true incidence and outcomes of this condition. Research should also explore the long-term effects of this manifestation to inform future treatment protocols and preventive measures.

In conclusion, while unilateral parotitis remains a relatively uncommon presentation of COVID-19 in children, its recognition is crucial for comprehensive pediatric care during

the ongoing pandemic and beyond. Continued vigilance and research are imperative to fully elucidate the spectrum of SARS-CoV-2 manifestations in the pediatric population.

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