

Complications with COVID-19 diagnosis – case report and literature review

KRZYSZTOF KOWALIK^{1, A, D-G}, ANNA GRUSZCZYŃSKA^{2, A-G}, ANDRZEJ MODRZEJEWSKI^{1, A-G},
ORCID ID: 0000-0001-8928-7578
AGNIESZKA KOWALSKA^{3, A-G}, KRYSZTIAN KASPEROWICZ^{4, G}

¹ Department and Clinic of General Surgery, Pomeranian Medical University, Szczecin, Poland

² Faculty of Medicine and Dentistry, Pomeranian Medical University, Szczecin, Poland

³ Emergency Department, St. Luke's Specialist Hospital, Konskie, Poland

⁴ Faculty of Health and Life Sciences, Northumbria University, Newcastle upon Tyne, UK

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Summary The authors present a case report of an 11-month-old boy who underwent a swab collection for SARS-CoV-2 virus. During the procedure the end of tip got broken, and the cotton part was found in the child's stomach and extracted endoscopically. To date, no similar cases involving children have been found in literature. The authors also reviewed literature for other complications during diagnosis of COVID-19 infection.

Key words: COVID-19, complications, case reports, review.

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Background

SARS-CoV-2 virus was identified in January 2020 [1–3]. The course of the disease can be asymptomatic but can also lead to severe respiratory failure [4]. The most common symptoms of COVID-19 are fever, general weakness, cough, shortness of breath, sore throat, headache, conjunctivitis and gastrointestinal distress [5]. Coronavirus can lead to severe interstitial lung damage, acute respiratory distress syndrome (ARDS) and multiple organ failure. The disease is most common in elderly patients with multiple comorbidities [6, 7].

The main diagnostic method is real-time PCR (RT-PCR) for SARS-CoV-2. The test is performed from material collected from the upper respiratory tract (nasopharyngeal swab, pharyngeal swab and nasal mucosa collected simultaneously). Material is seldom obtained from the lower respiratory tract (uninduced sputum, tracheal aspirates or BAL (bronchoalveolar lavage)). Bronchoscopy is not routinely recommended as a diagnostic method for COVID-19 [8]. Aspiration of samples from the trachea, or BAL, can be used in intubated patients [9].

Case report

An 11-month-old boy (preterm – 27 hbd) was admitted to the Children's Ward because of a fever of more than 38.5 degrees Celsius that had persisted for four days. The child was dependent on oxygen until he was 5 months old. In addition, the boy was burdened with bronchopulmonary dysplasia, retinopathy of prematurity. On physical examination, other than fever, no other abnormalities were detected. During admission, the boy was swabbed from the nasopharynx for SARS-CoV-2 virus. During the collection of the material, part of the swab broke off. The attempt to remove the foreign body proved unsuccessful. The child did not develop dyspnoea. The child was transferred to the

Children's ENT Department to another hospital for consultation. At this ward, the boy underwent nasofiberoscopy, which did not visualise the foreign body in the upper airway. After completing a history, the child's mother reported that the boy had a vomiting reflex four times and then calmed down. The consulting ENT specialist ordered a gastrointestinal consultation due to the suspicion of a foreign body in the gastrointestinal tract. Under general anaesthesia after intubation, the child underwent gastroscopy, during which a foreign body was found in the stomach in the form of a 7-centimetre plastic swab, which was removed. The boy was swabbed again for COVID-19 virus. The result of the swab by Real-Time PCR was negative. During the boy's 3-day stay in the ward, resolution of fever was observed.

Discussion

The preferred technique for the diagnosis of COVID-19 is the collection of material for examination from the upper respiratory tract by means of a nasopharyngeal or pharyngeal and nasal mucosal swab. Material from the nasopharynx is collected with a flexible, usually plastic swab inserted through the anterior nostrils. The swab is inserted into the nasal passage parallel to the palate to a depth equal to the distance from the nasal opening to the mouth of the external auditory canal [10]. It is then rotated 3 times or for 5–10 seconds, after which it is slowly removed in a circular motion, and then the same operation is repeated in the other nasal opening. The examination is uncomfortable but should not cause severe pain. When there is pain or palpable resistance during swabbing, the test should be stopped [11]. Material from the nose and throat can be collected with one or two swabs. If two swabs are used, one swab is taken from the throat and the other from both anterior nostrils. The throat is sampled by rotating, rubbing the back wall of the throat without touching the surface of the mouth, tonsils and tongue. It is recommended that only synthetic fibre swabs



wound on a plastic stick be used for collection. Other fibres may inhibit the RT-PCR reaction. The FDA recommends collecting the material for the test using a swab with an aluminium or plastic handle [12].

The Center for Disease Control and Prevention (CDC) indicates that a swab should be taken from the anterior nostrils, middle nasal auricles or nasopharynx [13]. Material obtained by swabbing the anterior nostrils or middle nasal auricle has less diagnostic accuracy [14].

According to literature, a nasopharyngeal cavity swab should remain a routinely performed method of collecting material for examination despite the fact that it is associated with the possibility of numerous complications [13].

Literature describes a patient around the age of 30 who had similar separation of the during swab testing for nasopharyngeal cavity screening. An endoscopic examination revealed a fragment of the swab between the middle nasal auricle and the septum [15].

Literature also presents a case of a 99-year-old patient who developed complications after a drive-through test following a nasopharyngeal cavity swab for COVID-19. During the test, the aluminium swab broke. Suspecting that a foreign body was in the patient's body, a series of X-rays were taken to determine the location. The radiographs failed to visualise the aluminium swab fragment. An endoscopic examination of the nasopharyngeal cavity was then performed, during which a fragment of the swab was observed between the left inferior nasal auricle and the bottom of the nose. During the examination, the five-centimetre foreign body was removed with forceps [16].

The most common complications that occur after swabbing when diagnosing COVID-19 from the anterior nostrils, middle nasal auricles or nasopharynx are nasal bleeding, the leaving of a foreign body, cerebrospinal fluid leakage and nasal septal abscess.

Nasal bleeding is estimated to occur in about 8.3% of patients with a nasopharyngeal test. Typically, these bleeds resolved spontaneously and do not require intervention by an otolaryngologist to stop the bleeding [17]. In a minority of cases, otolaryngologists had to perform nasal tamponade or endoscopic cauterization before tamponade [18]. Patients with HHT (congenital haemorrhagic haemangioma), nasal septal abnormalities, tumours or other vascular malformations have an increased risk of nasal bleeding [19]. Patients taking anticoagulants also have a higher risk of unremitting spontaneous nosebleeds [18, 20].

Literature notes that the risk of leaving a foreign body after swabbing depends on the location where the test was performed. Cases of leaving a swab fragment during nasopharyngeal swabs have been described more frequently [16, 18, 21–23] compared to swabs of the middle nasal auricle [24]. Typically, detachment of the swab portion occurred along the stem [16, 23, 24]. The probable cause of the swab fragment being left behind could not always be identified in all cases [16, 23, 24]. In some cases, the reason for the detachment of a portion of the swab was the excessive torque created when examining uncooperative patients [21, 22].

In most of the cases described, the foreign body was successfully removed during swab collection or at the otolaryngology clinic [16, 18, 21, 22, 24]. When no foreign body was found on nasal endoscopic examination, the swab fragment was suspected to have been swallowed. It was then removed from the stomach using forceps [23]. Leaving a foreign body in the nasal or nasopharyngeal cavity, due to the lack of immediate treatment, can result in an inflammatory response that makes it difficult to find and remove the foreign body after a few days.

Another possible complication mentioned in literature is leakage of cerebrospinal fluid after nasopharyngeal swabbing [25–27]. Treatment includes an endoscopic, surgical procedure to stop the fluid leak [25, 27]. In addition, due to bone damage and fluid leakage, the patient may develop septic meningitis [26].

Another described complication is infection of the nasal septum. A patient who had previously been swabbed developed a nasal septal abscess. Otolaryngological treatment consisted of incision and drainage of the abscess under local anaesthesia [18].

It is recommended that alternative diagnostic methods be used if there are risk factors that could result in complications after a smear to detect SARS-CoV-2 [28]. Among the patient risk factors are a condition following sinus surgery, a history of trauma or skull base defects [25], the presence of a disease that reduces blood clotting or the taking of anticoagulants or the presence of tumours or vascular malformations in the nasopharynx.

The presence of a foreign body in the form of a swab in the patient we described could have caused damage to the oesophageal or gastric wall. The shaft of the swab may also have entered the trachea.

About 80–85% of swallowed foreign bodies travel through the gastrointestinal tract and are excreted without leaving any damage [29]. Some of these, especially long, sharp or pointed foreign bodies, may penetrate the oesophagus or cause perforation of the oesophagus. This can result in extra-oesophageal abscess, mediastinitis, tracheoesophageal fistula [30–32]. The foreign body may also migrate into the fascial spaces of the neck [33–36]. Perforation of the thoracic segment of the oesophagus is associated with a higher risk of mortality than perforation of its cervical segment [37]. Delayed recognition of perforation and treatment is associated with increased mortality [37–40]. Individuals with abnormal gastrointestinal motility due to oesophageal or duodenal stenosis are most at risk for complications after foreign body ingestion [41]. Previous surgeries, such as tracheoesophageal fistula in children, can cause a foreign body to be retained around the surgical site. Previous surgeries for pyloric stenosis also increase the risk of its perforation by a foreign body [42]. In the 11-month-old boy presented here, a seven-centimetre piece of swab was removed endoscopically from the stomach. The likelihood of a foreign body several centimetres long from the stomach entering the distal gastrointestinal tract is believed to be low.

Aspiration of a foreign body into the trachea or bronchi is a life-threatening condition in children [43]. It can lead to cardiac arrest or respiratory arrest [44]. In neonates and infants, foreign bodies mainly enter the larynx and trachea. Pointed and sharp foreign bodies can cause tracheal or bronchial rupture.

Complications of foreign body aspiration or ingestion can include obstruction, erosion or infection (contributing to the development of pneumonia), atelectasis, abscess, fever, dysphagia, perforation or erosion of the oesophagus [45].

Conclusions

1. Swabbing for COVID-19 is not without risk of dangerous complications.
2. If the swab is inserted too deeply through the nose, it can cause the swab to break and further migrate into further sections of the gastrointestinal tract.
3. If attempts to evacuate the foreign body are unsuccessful, the intervention of an otolaryngologist or gastroenterologist is necessary.

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Address for correspondence:
Agnieszka Kowalska, MD
Szpitalny Oddział Ratunkowy
Specjalistyczny Szpital św. Łukasza w Końskich
ul. Gimnazjalna 41B
26-200 Końskie
Polska
Tel.: +48 41 3902231
E-mail: lupuseq@gmail.com