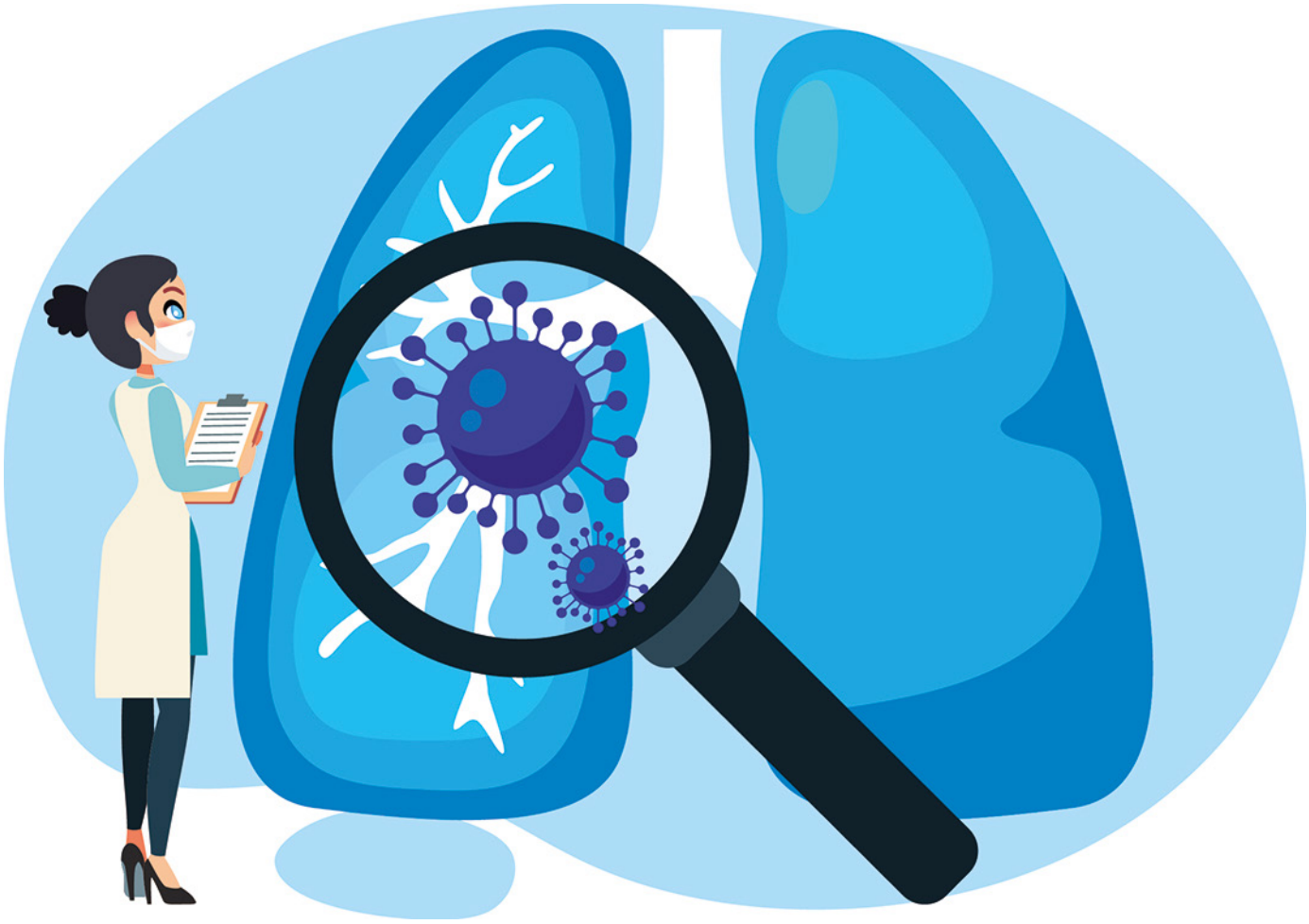
Dra. Clara Guede Fernández.
Specialist in Family and Community Medicine
C.S. de Lavadores, Vigo, A Coruña, Spain.
Member of Fundación redGDPS.
Coordinator of the Diabetes Group of AgaMFeC.

Dra. Xiana Rodríguez Villalón.
Specialist in Family and Community Medicine
C.S. de Porriño, A Coruña, Spain.
Member of Fundación redGDPS.
Member of the Diabetes Group of semFYC.



Respiratory Infections in People with Diabetes:

What You Need to Know to Address Them in your Office

In Spain, as in almost all of Europe, respiratory infections increase during the autumn and winter periods. During this time, consultations in Primary Care (PC) and emergency services, both hospital and out-of-hospital, see an increase in the number of visits due to these intercurrent conditions.

Mellitus diabetes (DM) has always been considered a condition that increases the risk of acquiring and developing infections, including respiratory infections, although clear scientific evidence has not been established as to whether this risk is due to poor glycemic control or to worse metabolic control. More studies are being published regarding the relationship between chronic inflammation and immune system alterations.

People with diabetes present macro- and microvascular complications, where the lung also becomes a "non-classic" target organ of these complications, as there are structural and functional changes at pulmonary level in the context of this disease (1, 2).

Acute respiratory infections (ARIs) can be classified from an anatomical point of view into upper or lower airway infections.

Acute pharyngotonsillitis (APT) is one of the most common upper airway respiratory infections in primary care consultations, which manifests as an acute febrile episode with inflammation of the mucous membranes of the pharynx and/or tonsils with erythema, edema, exudates, ulcers, and vesicles. The reference test for diagnosing APT is the throat swab culture. However, the result is not received before 48-72 hours, and this leads to the diagnosis often being established based on clinical criteria in routine practice. Between 40% and 70% of these cases are viral, and antibiotic therapy is only recommended when the pharyngitis is of bacterial origin, with group A beta-hemolytic streptococcus (GABHS) being the most common pathogen, responsible for 5%-15% of all pharyngotonsillitis cases in adults. In people with diabetes, we must prioritize diagnosis, and for this, we use the modified **Centor criteria by McIsacc** *(Fig. 1)*. If the score is > 3, it is recommended to prescribe antibiotics.

There are clinical situations where we would prescribe antibiotics directly: severely immunocompromised patients, patients with a past medical history of rheumatic fever, or in the context of a community outbreak of GABHS (eg, scarlet fever rash, raspberry tongue, impetigo) and patients with a severely compromised general condition. In other situations where the rapid test has less validity, we should run a culture test, eg, when the patient has previously taken antibiotics or in cases of chronic pharyngitis (3).

Lower respiratory tract infections are a common reason for consultation in primary care and for the use of antibiotics. They typically present with cough as the main symptom. In addition to the cough, there may be dyspnea, tachypnea, fever, chest pain, wheezing, and abnormal findings on respiratory auscultation. Most acute respiratory infections are mild and self-limiting, whether viral or bacterial in origin.

Acute bronchitis in patients without severe criteria is the most common finding, and its »

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CRITERION	SCORE
Fever ≥ 38ºC	1
Absence of cough	1
Anterior cervical adenopathies	1
Tonsillar exudate	1
AGE	
3-14	1
15-44	0
≥ 45	-1

FIGURE 1. Own creation

» etiology is viral in more than 90% of cases *(Fig. 2)*. However, antimicrobial treatment may be beneficial in a limited group of patients, such as frail individuals and the elderly with significant comorbidities.

Influenza is a highly contagious respiratory disease caused by influenza A and B viruses. It is characterized by the sudden onset of self-reported fever, with at least one respiratory symptom (cough, sore throat, nasal congestion or rhinorrhea) and one systemic symptom (headache, muscle aches, sweating or chills, or fatigue). Clinical differentiation between influenza and other respiratory viral infections is difficult. For this, rapid diagnostic tests available at pharmacies are useful, though not all health care centers in Spain offer them.

In people with diabetes, the risk of complications due to influenza infection is higher due to both the presence of diabetes and associated comorbidities such as hypertension, dyslipidemia, obesity, etc.

The first recommendation is vaccination as a preventive measure to reduce mortality and hospitalizations in this population group. A recent Spanish study explores the barriers to vaccination and suggests improving strategies with awareness campaigns aimed specifically at younger people with diabetes and those with higher educational levels, infrequent users of health services, and those facing economic barriers and low social support (5).

Coronavirus-induced respiratory infections are also a common cause of acute bronchitis in people with diabetes. Since the start of the pandemic in 2019 and its increased incidence in Spain in 2020, rapid antigen detection tests have been developed and become widely used, promoting greater protection by reducing transmission. People who know their positive result are more aware of the need to prevent the spread to vulnerable family members and close contacts.

Within the vulnerable population, people with diabetes are advised to use antiretroviral treatment, which is now available in many regions from health centers and reduces mortality and hospitalizations due to this condition. However, the size of the benefit may be smaller in the current population since the study was conducted before the Omicron variant, which is characterized by less frequent progression to severe disease (6).

Community-acquired pneumonia (CAP) in adults is a common lower respiratory tract infection. Its incidence is lower than that of acute bronchitis and is estimated at 5-12 people/1000 inhabitants/year. The most common pathogens in the outpatient setting among bacterial causes include: Streptococcus pneumoniae, Haemophilus influenzae, Mycoplasma pneumoniae. As for respiratory viruses, Influenza is the most common, followed by Parainfluenza and RSV. SARS-CoV-2 has been a major cause during the pandemic. Mixed viral-bacterial infections are relatively common. It is increasingly recognized that respiratory viruses are a common cause of CAP, either as a single pathogen or as a contributing organism. These mixed infections have been found to be associated with more severe CAP and longer hospital stays than those caused by bacteria alone (7).

Diagnosis is based on suspected signs and symptoms, which should be confirmed through complementary laboratory and/or imaging modalities, not always available in primary care (PC).

Among imaging modalities, chest X-rays are increasingly being replaced by lung ultrasound, which has higher sensitivity for diagnosing CAP, with limitations being examiner-dependent knowledge and experience. The use of ultrasound is becoming more frequent in health centers, and its easy access and zero exposure to ionizing radiation are clear factors to consider for its expanded use.

The use of severity indices or prognostic scales, such as **CRB65** (confusion, respiratory rate, blood pressure, and age ≥ 65), helps in the decision to refer to the hospital, considering the associated mortality risk. If CRB65 is 0: low risk with mortality risk < 1%, 1 or 2 is considered intermediate risk with a 1%-10% mortality risk, and if the result is 3 or 4, it is high risk with an estimated mortality risk > 10%. In AP, people older than 65 years without other severity criteria should be closely monitored, with appropriate follow-up.

However, it is difficult to distinguish between bronchitis and pneumonia without additional tests. Hence, new recommendations are emerging to help decide whether to prescribe antibiotics, which is perhaps the key point of controversy in these pathologies in Primary »

VIRUSES	BACTERIA
Influenza A and B (flu) Parainfluenza Respiratory syncytial virus (RSV) Coronavirus Rhinovirus Metapneumovirus Adenovirus	Bordetella pertussis Mycoplasma pneumoniae Chlamydia pneumoniae

FIGURE 2.
Etiology of Acute Bronchitis. Adapted from Graziani Noriega, et al. (4).

» Care. This is, of course, of great importance in people with diabetes, who are more vulnerable.

C-reactive protein (CRP) is an acute-phase reactant that rises nonspecifically in response to tissue damage or inflammation, and it can be elevated in infections or inflammatory processes of any origin. Its normal values are typically < 5 mg/L, rising quickly after an acute inflammatory response, reaching a maximum of 20 to 500 mg/L after 48 hours. It is the most widely used rapid diagnostic test for lower respiratory tract infections. Its determination in capillary blood aims to detect severe lower respiratory infections or pneumonia. It has a sensitivity of 97.4% and a specificity of 99.9% for a cutoff value of 10 mg/L. There are no clearly established CRP threshold values for recommending or not prescribing antibiotics, but the finding of elevated values in combination with clinical judgment supports identifying those patients who would benefit most from antibiotic treatment (8).

According to the CRP result at the point of care: CRP >100 mg/L: prescribe antibiotics, CRP <20 mg/L: do not prescribe antibiotics. For CRP between 20 and 100 mg/L, individualized assessment is recommended, with the possibility of direct prescription, delayed prescription, or no prescription of antibiotics (9). D

CONCLUSIONS:

Poor glycemic control, especially in the context of respiratory infections, can lead to metabolic complications and complications related to the infection per se.

Therefore, in addition to antimicrobial therapy, it is important to emphasize achieving good glycemic control. Insulin requirements may increase during these infections, so insulin is the preferred antidiabetic treatment for people with severe infections (10).

It is essential for family doctors to understand the importance of controlling and monitoring these individuals due to the high probability of complications they may present.

Improving vaccination coverage as a preventive measure against severity, as well as proper hand hygiene, are fundamental measures to improve infection control. To improve community health, we must optimize antibiotic treatment for these conditions that are so relevant in people with diabetes. Improving antimicrobial prescription is part of our routine clinical practice.

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