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Editorial

Home Respiratory Therapy: Technological Innovations in Severe Chronic Obstructive Pulmonary Disease☆

Terapias respiratorias domiciliarias: innovación tecnológica en la enfermedad pulmonar obstructiva crónica grave

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Chronic obstructive pulmonary disease (COPD) is one of the leading causes of morbidity and mortality, and is related with a higher degree of dependency, functional limitations in activities of daily living and associated comorbidities, especially in the more advanced stages. Episodes of exacerbation (ECOPD) appear most often in this patient group, and have a significant economic, prognostic and functional impact.[1]

The circumstances surrounding COPD call for a change in the current disease-centered care model and the introduction of a coordinated "case management" approach.

Information and communication technology (ICT) resources, and more specifically, telemedicine (TLM), are part of this strategy.

TLM has developed in parallel with advances in technology; one of the first experiments dates back to World War I, where medical information was transmitted over the radio.

TLM is currently available in different areas of clinical care: care processes, patient management, and information and training services for users and professionals. Care processes include all the activities carried out in a face-to-face "medical act": teleconsultation, telediagnosis, telemonitoring and telecare.[2]

Although all these applications have been used in COPD, the greatest scientific output at present is most probably focused on "telemonitoring" resources for home monitoring.

One of the main limitations observed in telemonitoring studies is the wide range of ICTs used: telephone, videoconferencing, online applications, e-mail, USB (Universal Serial Bus), etc. Moreover, only a few studies have focused on patients with severe airflow obstruction, home oxygen therapy, comorbidities and limitations in activities of daily living.

The TLM platforms used were very similar in general, and are based on data collected by the patient (questionnaires and/or monitoring parameters in most cases). These are sent to a "triage unit", consisting of specially trained nurses who analyze the information received and confirm the "medical alerts". This significantly lightens the physician's workload, and increases their level of satisfaction with these programs.[3]

The parameters subject to telemonitoring must also be considered. While there are no specific data on what would constitute the "ideal parameter", several parameters, rather than a single value, should probably be monitored. Hurst et al. found that when oxygen saturation (SpO_2, measured by pulse oximetry) and peak flow were monitored, variations were detected in the days prior to ECOPD that enabled prompt action to be taken.[4] Variations greater than or equal to 1 standard deviation of the parameter, together with the presence of symptoms, had a sensitivity and specificity of 71% and 74%, respectively, for detecting ECOPD. The respiratory rate has also been shown to be a useful parameter for predicting ECOPD, even before onset of the characteristic symptoms.[5]

As mentioned above, few studies have focused on the more severe COPD population. However, the findings obtained have shown that TLM is a useful tool for monitoring these patients, and can detect ECOPD earlier. This reduces the number of visits to the emergency room, the frequency of admissions, and the overall length of hospital stay.

Vitacca et al. carried out a TLM study based on pulse oximetry monitoring. A total of 101 COPD patients with severe airflow obstruction (FEV_1 39%) were included, 57 in the conventional care (CC) group and 44 in the TLM group.[6] The number of admissions for ECOPD was significantly lower and the likelihood of remaining exacerbation-free during the study period was greater in the TLM group.

Spanish studies by De Toledo et al.[7] and Jodar-Sánchez et al.[8] reported similar findings in a COPD population with severe airflow obstruction.

The findings of the PROMETE study[9] showed that patients monitored by TLM (in this case with daily collection of SpO_2, peak flow, blood pressure and heart rate parameters) had significantly

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fewer episodes of ECOPD requiring hospital assessment (fewer admissions and fewer visits to the emergency department), and less severe exacerbations. In the CC group, a significant number of patients were admitted with respiratory acidosis and required non-invasive mechanical ventilation, compared with none from the TLM group.

Other groups have used TLM platforms for home care of patients with exacerbations, finding it to be comparable to hospital assessment in certain patient groups.[10]

Despite the positive results reported, no clear differences in favor of TLM have been found in terms of mortality (except for isolated cases) or quality of life (QoL). This could be due to the prognosis of the disease itself in more advanced stages and the limited duration of the studies as a whole, which prevented identification of these factors. In the case of QoL, it could be due to comorbidities (anxiety, depression) and other social and/or family circumstances not evaluated and, therefore, not treated.

There are still several issues to be clarified, particularly economic considerations, before further progress can be made in implementing TLM programs. Most studies show that these programs are cost-effective, but more solid evidence is required. Specific training of health professionals, patient selection, and amendments to current legislation are also crucial.

In conclusion, technological advances have led to improvements in chronic patient care. TLM has been shown to be effective in the monitoring and treatment of ECOPD in patients with more severe COPD.

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