

Fresh advance in the diagnosis and control of childhood asthma

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Dr. Paula Corcuera is an assistant consultant in infant pneumology of the Pediatric Service of the Hospital Universitario Donostia in San Sebastian. Credit: UPV/EHU

In a piece of research run at the Paediatric Service of the Hospital Universitario Donostia, Dr Paula Corcuera-Elosegui, assistant consultant in Infant Pneumology, has studied the validity of the exhaled nitric oxide measurement as a complementary procedure in diagnosing and

monitoring treatment for childhood asthma and overseeing the condition. She not only confirmed the usefulness of the test, she was able to develop a technique to apply it in breast-fed babies.

Asthma is the most frequent chronic disease in childhood. According to Dr Corcuera, "the prevalence of infant asthma in the north of the [Iberian] peninsula is 10%," and she added: "Despite the advances that have taken place in recent years, this disease continues to have significant consequences for the patients, their families and the healthcare system."

The doctor defined asthma as a complex disease, "because it manifests itself differently in each child, and the response to treatments also varies in each case." One of the most well-known tools for diagnosing and assessing the degree of control of the disease is spirometry, which is used to determine lung function. However, spirometry may not be enough, and in recent years an important marker has emerged to complement the information provided by the spirometry test. It is exhaled nitric oxide, and this is in fact the focus of Dr Corcuera's study.

"All of us mammals exhale this molecule," explained Dr Corcuera, "and it is known that in asthma and in some other diseases its level may be above normal." As there were few studies on exhaled nitric oxide in paediatric patients, the Infant Pneumology Unit set up a line of research to assess how useful the exhaled nitric oxide measurement is.

Dr Corcuera highlights certain aspects of the research, which has taken eight years. For example, with breast-fed babies "we use a mask that covers the nose and mouth and that way we collect the nitric oxide they have exhaled in consecutive breaths with tidal volume." On the other hand, with older children, they carried out the validation of portable analysers that do not require such complex equipment or such specialised personnel.

Outstanding results

Although Dr Corcuera admitted that the technique had certain limitations, and therefore always had to be complemented with clinical observation and the spirometry test, they have, however, proven that it is a valid, useful test, not only to help diagnose the disease but also to monitor the patients. "One of the outstanding results is that the determination of exhaled nitric oxide can also be done on breast-fed babies," stressed Corcuera. "We have seen that the determination using multiple respirations with tidal volume and using a mouth-and-nose mask can be studied irrespective of age."

Another of the new aspects observed in the study is that exhaled nitric oxide is usually determined proximally; in other words, in the bronchial tubes. Nevertheless, in the study carried out at the Hospital Universitario Donostia, the nitric oxide was also measured distally or on an alveolar level. This slight difference is important, since the results obtained suggest that raised alveolar nitric oxide could be linked to more severe asthma.

"To determine alveolar nitric oxide, we used another technique that determines the nitric oxide in several flows," specified Corcuera. This technique has been applied to youngsters of between the ages of six and sixteen. "By means of a mathematical model, we do an approximation of alveolar nitric oxide, and it seems that those with a raised level of nitric oxide had had a larger number of crises over the previous month."

However, the doctor warned that this link was not conclusive, "because the sample was quite small and the group of patients chosen were not ones with more severe asthma either." That is why she said that she was planning "to go on studying this aspect to obtain clearer results."

For the moment Dr Corcuera's thesis (Óxido nítrico exhalado y asma:

metodología, interpretación de los resultados y aplicaciones en niños - Exhaled [nitric oxide](#) and [asthma](#): methodology, interpretation of the results and applications in children) covers the results and conclusions obtained so far. In addition, there has been significant dissemination of this work in the field of medical research through the publication of four papers in specialised journals.

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