

Some statistical data about anterior rhinomanometry

A comparative study between passive anterior rhinomanometry and active anterior rhinomanometry

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SUMMARY

The authors studied the value of the passive anterior rhinomanometry. In a first group of 28 patients it was possible to determine by a confidence interval test if the type of the airstream was mainly laminar or turbulent. In a second group of 15 test subjects the type of airstream was graphically determined. At the same time, the values of nose resistance obtained with the P.A.R. were compared to the values obtained with active anterior rhinomanometry.

In a previous publication, it has been shown that the P.A.R. is an easy and quickly performed test for rhinomanometric evaluation in allergic diagnosis (Clément et al., 1978). These authors have statistically evaluated the influence of the size of the nozzle, and situation in which the permeability is measured. From these data follows that there exists a clear cut influence of the size of the nozzle used and that the situation with the mouth open and saying "a" gives the more reliable results. The aim of this study is now to compare the values of nasal resistance obtained with P.A.R. and with active anterior rhinomanometry according to the Guillerm method (1961-1967) and to evaluate the nature - laminar or turbulent - of the airstream (i.e. the value of "n" in the formula $R = \Delta P / V^n$ in which $1 \leq n \leq 2$).

In the Clément group, twenty eight normal subjects were tested. The permeability of each nostril was determined by P.A.R. with mouth open and successively changing flows (i.e. 15-13-11-9-7-5-3 liter a minute).

n was calculated

$$R = \frac{\Delta P}{V^n} \text{ or } n = \frac{\log (\Delta P)_2 - \log (\Delta P)_1}{\log V_2 - \log V_1}$$

All the measurements were done with the new type P.A.R. rhinomanometer (Heyer Company) on the most sensitive scale (from 0-20 mm H₂O).

In the Daele group 15 normal subjects were tested with the same apparatus (P.A.R.). In their equipment they used 4 different flows (5-10-15-17 L/min) and performed every measurement in triplo. The different values of the flow and the

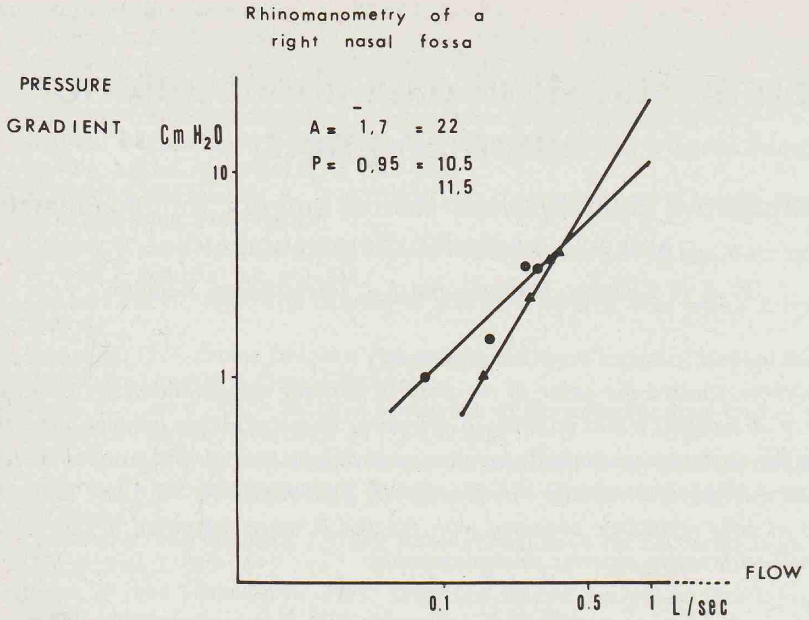


Figure 1. \blacktriangle : active anterior rhinomanometry (A.A.R.)=A
 \bullet : passive anterior rhinomanometry (P.A.R.)=P
 for a flow of 1 l/sec $R = \Delta p$

with A.A.R. $n = 1.7$ and $R = 22 \frac{\text{cm H}_2\text{O}}{\text{l/sec}}$

with P.A.R. $n = 0.95$ and $R = 10.5 \frac{\text{cm H}_2\text{O}}{\text{l/sec}}$

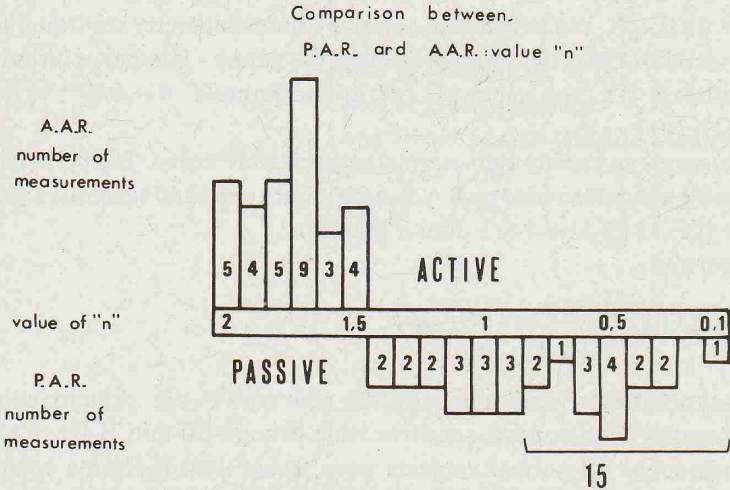


Figure 2. 30 measurements of "n" in 15 tests subjects. With the P.A.R. the value of "n" was less than 1 in 15 measurements.

pressure gradient were plotted on a logarithmic scale (Figure 1). So it was possible to determine the value or the exponent n . Once, the value of "n" known, the total resistance can easily be calculated. In the same experiment an active anterior rhinomanometry according to the Guillerm method (Guillerm et al., 1961 and 1967) was performed in all the tests subjects.

RESULTS

The results of the Clément group of 28 patients are exposed on the Table 1.

Table 1.

Flow	n	
3- 5 liter/min.	0.85	+ or - 0.18
5- 7 liter/min.	0.77	+ or - 0.27
7- 9 liter/min.	0.67	+ or - 0.43
9-11 liter/min.	0.85	+ or - 0.39
11-13 liter/min.	0.77	+ or - 0.44
13-15 liter/min.	0.77	+ or - 0.66

From the results of the Daele group of 15 patients one can compute the value of "n" (Figure 2, histogram). Again one can see that for the P.A.R. measurements 90% of the values are between 0.7 and 1.4.

Figure 3 shows the correlation between the active and passive anterior rhinomanometry.

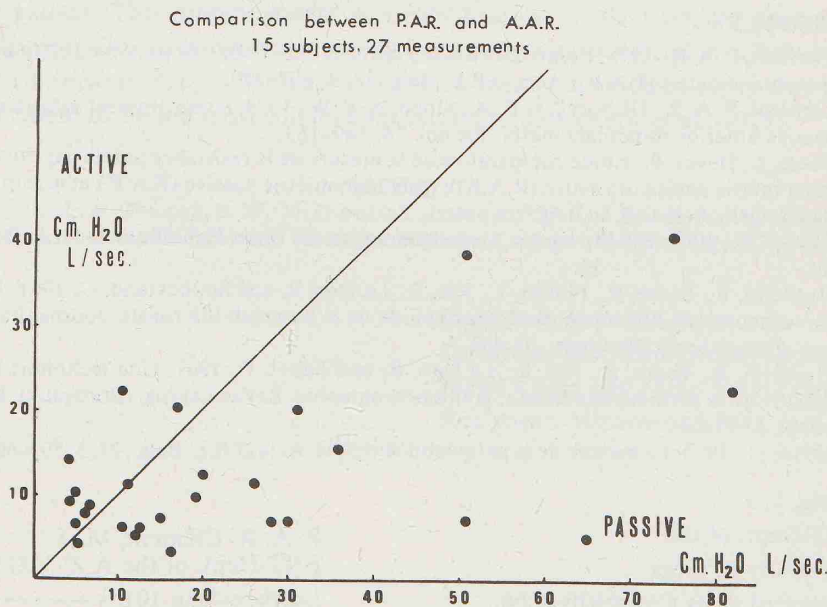


Figure 3. The spreading of R is less with the A.A.R.

DISCUSSION

From Figure 3 follows that there does not exist a perfect correlation between the active and the passive rhinomanometry. This lack of perfect correlation is due to the fact that the active anterior rhinomanometry is more precise. Daele et coll. (in-press) found with the latter method a more restricted dispersion of the values of "n" (i.e.: $n = 1.7-2$), while with the P.A.R. the values were between 0.7-1.4 (Figure 2). A flow of 15 liter/min. has been chosen because it corresponds to the flow which exists under physiological condition during rest or light labor, i.e. 15-30 L/min. (Fischer, 1969).

In conclusion, one can state that though the P.A.R. is an easy, quickly performed and not expensive method, it lacks precision. For a precise rhinomanometrical evaluation the active method is to be preferred. For nose provocation with allergens the P.A.R. can be very useful.

RÉSUMÉ

Les auteurs évaluent la fiabilité de la rhinomanométrie antérieure passive. Dans un premier groupe de 28 patients, ils déterminent par un test d'intervalle de confiance, la nature laminaire ou turbulente du débit nasal. Dans un second groupe de 15 sujets, la nature du régime d'écoulement est estimée graphiquement et les valeurs de résistance nasale obtenues par rhinomanométrie antérieure passive sont comparées à celles mesurées par rhinomanométrie antérieure active.

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