

CLINICAL EVOLUTION OF ASTHMA FROM EARLY CHILDHOOD TO DEVELOPMENTAL AGE

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[Evoluzione clinica dell'asma dall'infanzia all'età evolutiva]

SUMMARY

The aim of study was to conduct evaluation over twenty years on patients with relapsing wheezing breathing since their early years of life. The research included a period of observation started in 1978 up to 2002.

The follow-up included 381 patients. The enrolment was carried out during the first 15 years, after being evaluated during outpatient or/and hospitalization the children with a clinical picture resembling asthma (at least three episodes of dyspnea for a year, at least 2 years prior to our first observation). During follow-up the role of some risk factors in childhood able to affect the persistency of asthma in adulthood was considered.

An early onset of symptoms resulted to be a favourable prognostic sign. At the end of study 294 (77.16%) patients at 18 year of age already had a remission of the disease.

Patients with normal IgE levels and negative Rast and Prick skin tests presented a higher clinical remission: the rate were statistically significant. A symptomatic and preventive therapy practised regularly resulted to be a favourable factor for remission. The severity of symptoms result to be an unfavourable prognostic factor.

In conclusion, if asthma is recognized precociously can mitigate and remove symptoms and so improved adulthood lifestyle.

Key words: Asthma, Prognosis, Evolution, Environmental factors

RIASSUNTO

Scopo dello studio è stato quello di condurre una valutazione clinica, per un periodo protrattosi oltre 20 anni, su pazienti con patologia dispneizzante insorta nei primi anni di vita.

I soggetti sono stati seguiti con controlli periodici in regime di ricovero ed ambulatoriale per aggiornamenti clinici, laboratoristici e per la valutazione della risposta terapeutica.

Nel corso del follow-up è stato ricercato il coinvolgimento di eventuali fattori di rischio in grado di influire sulla persistenza dell'asma nell'adulto.

Sono risultati fattori prognostici favorevoli l'esordio clinico precoce, la negatività di Prick e Rast tests, IgE sieriche nei limiti della norma, la terapia farmacologica regolarmente praticata come prescritta.

La familiarità per atopia, la presenza di animali nell'abitazione e di fumatori nel nucleo familiare non hanno significativamente influenzato l'evoluzione della patologia.

In conclusione l'asma è una patologia sempre più emergente della quale negli ultimi anni sembra essersi anticipata l'epoca di esordio. Il riconoscimento precoce dei sintomi, tuttavia, l'intervento terapeutico e una profilassi ambientale precoci, avrebbero contribuito a migliorare la qualità della vita dei pazienti con attenuazione fino alla scomparsa dei sintomi in un buon numero di giovani adulti.

Parole chiave: Asma, Prognosi, Evoluzione, Fattori ambientali

Introduction

Asthma affects an increasing number of children from different pediatric ages, therefore, our knowledge regarding its long term course is still not well defined.

Recent studies have drawn their attention to processing predictive patterns which should identify those children with a greater chance to develop persisting asthma in their teens and adulthood ages, among children with wheezing breathing since their early age, as well as the identification, in some cases, when reviewing those factors suspected to have influenced in some way the natural history of the disease^(1, 2, 3, 4, 5, 6).

Long term studies of large groups are still lacking and often the way of enrolling patients, the evaluation of responsible predictable factors, and the knowledge concerning the evolution of the disease are not so reliable.

The aim of our study was mainly to conduct a clinical evaluation over years (twenty years) on patients with wheezing breathing since their early years of life.

These patients were evaluated regularly, either during their hospitalization or as outpatients at the Pediatric Clinic R of the University of Palermo (hospital Aiuto Materno with frequent clinical and laboratory data updates as well as the therapeutical response for each patient^(7, 8, 9)).

During follow-up the role of some risk factors in childhood, able to affect the persistency of asthma in adulthood, was considered.

Methods

The research includes a period of observation started in 1978 up to 2002.

The enrolment of patients was carried out during the first 15 years, after being evaluated during outpatient or/and hospitalization, among those children with a clinical picture resembling asthma (at least three episodes of dyspnea for a year, at least 2 years prior to our first observation), with a different degree of severity, clinical history, laboratory findings, and therapeutical response.

Children upon their enrollment (age between 3-10) were encouraged to have periodic follow-up at intervals between 1 to 6 months according to the previous clinical condition during their last check-up; at the end of the follow-up those who had completed the period of observation of at least 10 years and had reached 18 years of age were included in the study.

570 patients were selected, of which 189 were excluded in different periods of the study for several reasons: moving out of town, or to other hospital facilities, inability to undergo to periodical outpatient check-ups and/or telephone consultation.

381 patients were included in the study at the end of the follow-up.

For each patient in the follow up list a form was filled out (tab.1), updated at every check-up on which the following data were recorded:

- Anamnestic data concerning familial predisposition, type of nursing, respiratory infections contracted within the first year of life, indoor pollution staying in environments with highly irritating substances, such as tobacco smoke, animals, heating sources not regularly maintained, staying most hours of the day in confined environments, peculiar parents' job activities or hobbies practised at one's own home.

- The onset of the study symptoms were highlighted with a thorough medical history in those cases where the symptoms appeared prior to our first observation. Patients were divided in two groups, in relation to their first appearance of the disease: subjects with an early clinical onset (within the third year of life) and subjects with a later clinical onset.

- Routine laboratory test, standard skin allergy tests panel, RAST test, total IgE levels, spirometry tests were carried out on collaborating patients.

- The therapy given during acute symptoms, maintenance therapy and long term preventive treatment.

- Severity of symptoms: mild-moderate-severe asthma; number of crisis per year and changes of pattern.

During the long period of observation, patients were given a form with a monthly diary thanks to which it was easy to control the evolution of the disease, as well as, when symptoms occurred or when they disappeared. Processing these data together with the clinical check ups gave us the opportunity to have a prospective evaluation of a particularly long period of observation.

Patients were kept informed, both verbally and with brochures concerning environmental habits and health measures which they were suggested to follow. Data were processed statistically through tests at one end, the ones with a degree equal or below 0.5 were considered statistically significant.

Results

Results and main features related to the subjects selected are shown on tab.2.

The total patients in the study were 381, 249 males and 132 females; 177 had an early onset (46.45%) and 204 (53.55%) had an onset after their third year of age.

From a clinical point of view, asthma was considered to be mild for 6 patients (1.57%), moderate for 272 (71.40) and severe for 103 (27.03).

When we evaluated the evolution of the disease during youth, 294 patients (77.16%) at the age of 18 year old had a remission of the disease with no statistically significant difference between males and females. Subjects who had a clinical remission since their last evaluation (3-4 years before) were considered to be asymptomatic; this was ascertained by 199 outpatient follow-up; for 95 subjects who had quit for 3-4 years (they had a negative result at their last check up), remission had been evaluated by a telephone call which confirmed the absence of respiratory symptoms.

An early onset resulted to be a favourable prognostic sign because 153 (86%) had a clinical remission at an average age of 8 and it was maintained until they were 18; this correlation was considered statistically significant.

Patients who had had a later onset had a clinical remission at an average age of 12. Patients with normal IgE levels and negative RAST and Prick skin

tests presented a higher clinical remission rate which were statistically significant.

A familial predisposition, animals in the house, smokers among members of the family did not have a significant influence on the course of the disease. A preventive drug treatment, practised regularly and for long periods of time resulted to be a factor that strongly influenced the course of the disease toward the remission. The severity of symptoms, finally, resulted to be an unfavourable prognostic factor.

Discussion

In the last decades, the increasing pollution, changes in children's lifestyle and an earlier introduction to kindergarden have encouraged an anticipated contact with bacterial, viral and environmental antigens⁽¹⁰⁾.

This could have encouraged an anticipation of dyspnoic condition in early years of life, with an increase of 100% compared to past decades^(11, 12, 13, 14, 15, 16).

Airways in a child are rather narrow and shorter, this means a more difficult gas exchange and an increase of the resistance of the bronchial tree; furthermore, muscles and bone structure are not completely developed, cough itself is not an efficient mechanism, as opposed to adults, to eliminate the mucus.

All these cofactors (viral infections, anatomy-physiological factors) which start a chronic inflammation stage of the bronchial airways, contribute to reveal a condition of hyperactivity during childhood; they are missing in the following age in children who are not genetically susceptible to allergy pathologies⁽¹⁷⁾.

For those who have predisposition, therefore, an early environmental and drug prevention, as well as a symptomatic treatment aimed to solve even the mild broncospastic crisis, can interrupt chronic flogosis, therefore preventing eventually, a chronic condition of the allergic breathing pathology.

The result, which we had intended to reach, was obtained within several patients who were checked periodically, who put into practice our therapeutical-hygiene advice. The patients with early onset (with different grades of severity age between 6-10) who had a clinical remission were significantly greater in number respect to those who had had a late onset.

The great number of patients who became adults and had a clinical remission, does not allow us to ignore that some asymptomatic subjects had func-

tional alterations in their bronchial airways, since not all patients underwent a spirometric test^(9, 18).

An encouraging fact is that the 198 male patients with remission of the disease when called to the army evaluation declared they had had bronchial asthma, they were given PFT and none of them was excluded from the army because of this disease (18 boys were excluded from other pathologies: visual, neurological, methabolic), three of them started military careers and three became professional athletes.

As far as females are concerned, a girl, who had had clinical remission since she was 12, suffered from asthma symptoms at 18 during pregnancy and had remission after delivering the baby. Gender resulted to be an important factor in the appearance of the disease, but does not determine its maintenance. This is in contrast to what the literature reports, that is, there is a higher persistency of symptoms in women^(10, 12).

According to known data, we can affirm that a severe asthma condition may predispose to a worse prognosis in the future, as well as an allergy sensitivity condition resulted to be a negative factor for the prognosis.

Our study is particularly representative and prospective for a children population with dyspnea in a definite geographical area (Palermo and province) with the prevalence of severe clinical entities, since our hospital was, during the study, a reference centre for the area, of particularly difficult cases.

All the basic data were gathered during the enrollment, and during follow up evaluation.

The weakness of our study consists of a lacking of a blind follow-up of each patient.

The physician besides know clinical datum for each patient. On the other hand, since the age of the children's age during the enrollment in the 80s did not allow using physiopathologic parameters helpful in diagnosing asthma, it is probable that among the subjects observed, a percentage of early wheezers, who would have recovered spontaneously during growth, determined the age for most of the patients recovered from the disease.

Not all early wheezing children turn to be asthmatic adults, and for some of them the wheezing represents only a reaction to viral infections; for others, instead, it will turn into an asthma condition. There might be two different populations sharing the same symptoms that require two different diagnostic and therapeutical strategies^(10, 12).

N° of patients		REMISSION %		PERSISTENT ASTHMA %		TOTAL %	
		294	77.16	87	22.94	381	
Sex	Male	198	79.51	51	20.49	249	65.36
	Female	96	72.72	36	27.27	132	34.64
Onset	Early	153**	86.44	24	13.56	177	46.45
	Later	141	69.11	63	30.89	204	53.55
Severity of symptoms	1	6**	100	0	0.0	6	1.57
	2	218*	80.15	54	19.85	272	71.40
	3	70	67.97	33	32.03	103	27.03
IgE	>100 mg/dl	205	68.33	95	31.67	300	78.74
	<100 mg/dl	69*	85.19	12	14.81	81	21.26
Prick test eto Rast	Positive	157	56.88	119	43.12	276	72.44
	Negative	87*	82.86	18	17.14	105	27.56
Familiar predisposition	Yes	165	79.71	42	20.29	207	54.30
	No	129	74.13	45	25.87	174	45.67
Animals in the house	Yes	96	78.04	27	21.96	123	32.29
	No	198	76.74	60	23.26	258	67.71
Tobaco smoke	Yes	150	74.62	51	25.38	201	52.76
	No	144	80.00	36	20.00	180	47.24
Indoor pollution	Yes	88	66.67	44	33.33	132	34.65
	No	206**	82.73	43	17.27	249	65.35
Therapy	Yes	204	82.93	42	17.7	246	64.57
	No	90	66.67	45	33.33	135	35.43

Table 1: Feature of patients included in the study (when 18 years old). Influence of childhood potential risk factors and evolution of asthma in the adulthood. *P> 0.01; **P>0.05

In conclusion, asthma is a growing disease that, over the years, it seems to affect children at earlier ages; therefore, if symptoms are recognized on time, inflammation is treated with an efficient therapy and an early environmental prophylaxis reduce the chance of allergy sensitiveness, along with modern and effective means and tools, have all contributed to mitigate and disappearing of the symptoms and so improved adulthood's lifestyle⁽¹⁹⁾.

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Record-chart	
Surname:	Name:
Birth:	1° observation:
Address:	Tel: Place:
Diagnosis:	
Onset of symptoms:	N. episode/year: Stage:
Alimentation:	
Familiar atopy (0-0.5-1-2):	
Work of the father:	Work of the mother:
Smoking (1-2-3):	
Animals, ornamental plants, heating systems:	
N. hospitalisations: 1 -	
2 -	
3 -	
4 -	
Mantoux III:	Betalattotest:
IgA:	IgM: IgG: IgE:
Prick-Test:	
Rast-Test:	
Spirometry:	
Effort test:	
Sweat-Test:	
Radiograph of the chest:	
Therapy:	
Follow-up: 1 -	
2 -	
3 -	

Table 2: record-chart of the patients

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