

The general practitioner and nephrolithiasis

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Summary

Nephrolithiasis is a multifactorial disease the genesis of which is influenced by genetic, metabolic and environmental factors which determine a series of alterations in the urinary excretion of a number of substances, the cause of the disease itself. The general practitioner is often the first professional to be consulted as regards clinical and therapeutic treatment at the moment of the onset of nephrolithiasis, renal colic, inasmuch as contacted directly by the patient. His role however should not be limited to this initial phase but becomes of strategic importance throughout the subsequent diagnostic procedure; this is especially true with regard to relapses, in correctly placing the patient and, if necessary, referring him/her to the most appropriate specialist area. Running through the entire process which the lithiasic patient encounters from the onset of the disease until therapeutic treatment begins, it is clear how an appropriate initial approach can, in many cases, simplify and optimise such process. On the basis therefore of a complete medical record, and a few simple, biochemical and instrumental tests, the general practitioner is in a position to decide whether to treat the patient directly or to refer him/her to the most appropriate specialist field for investigation at a higher level. Over the last decades nephrolithiasis has progressively changed from being a disease of mainly surgical pertinence to being one of multidisciplinary medical interest in which the figure of the General Practitioner has a primary role, both during the initial diagnostic phase, by means of the correct physio-pathological identification of the problem, and in the subsequent phases as regards the choice and co-ordination of the various specialists involved.

KEY WORDS: *General Practitioner and nephrolithiasis.*

Nephrolithiasis is a disease with a strong epidemiological impact known of since ancient times; even though comprehensive data is not available, it is estimated that it has an incidence, constantly on the increase in industrialised countries, between 5% and 10% of the general population (1-10). For many years the disease was of strictly surgical pertinence and

the surgical approach has made significant progress over the last three decades; in fact the modern extra-corporeal and endoscopic methods of removing calculi have, in most cases, replaced the traditional surgical procedure (11-13). Still today however, the surgical approach to the disease has the drawbacks of not being entirely risk-free, not always being applicable and not affecting the probability of relapses (14-16). Over the same years the perfecting of laboratory techniques and the increased knowledge of pathophysiology have opened the way for a medical approach to the kidney stone disease which complements and integrates the surgical approach; in fact a series of anomalies of a metabolic or other nature origin, in turn resulting from an interaction of genetic and environmental factors, have been progressively identified which facilitate the onset of the disease and the correction of which modifies the prognosis (17-35). In other words the kidney behaves like a homeostatic organ which responds efficiently to a metabolic insult by correcting it, to the detriment of the upheaval of the urinary environment which is thus exposed to a lithogenic risk through the imbalance of over-saturation and inhibition. The identification and treatment of such anomalies is the purpose of the diagnostic-therapeutic process of medical pertinence, organised at various levels of diverse complexity in relation to the type of calculosis present and to the degree of activity of the disease (36).

The transit of the calculus along the urinary tract is often the first clinical sign of renal stone disease. Initial intervention is usually by the general practitioner or emergency services doctor (37); subsequent management of the disease is then taken over by the urologist with non-invasive or semi-invasive procedures which permit resolution of the contingent problem in over 90% of cases. After the surgical phase an appropriate metabolic assessment of the patient means that the pathogenesis of the nephrolithiasis can be investigated and the dietary-pharmacological measures identified to resolve the clinical manifestations.

The multidisciplinary nature of the approach to the patient affected by renal stone disease with the consequent risk of fragmentary intervention and the absence of a systematic approach thus emerges (38).

The general practitioner is often involved in dealing with a disease which has come to his/her knowledge in varying circumstances: because called in directly during a renal colic or as a result of echography and/or X-rays performed on account of the presence or suspicion of other diseases or simply as the conclusion of an anamnesis (38).

The purpose of this study is to focus on the instruments available to the general practitioner through which he/she can perform a clearly-defined role in the diagnostic-therapeutic process of nephrolithiasis.

The general practitioner is often the first professional figure involved at the moment of the onset of the disease: renal colic. This is an acute clinical phase caused by the engagement of the calculus in the excretory tract, characterised by the onset of a violent visceral pain with cramps at the side of the body, with more or less extensive anterior irradiation as far as the hypogastric-inguinal region as a result of the varying section of

the ureter affected. It is often associated with neuro-vegetative symptoms such as nausea, vomit, sweating and micro/macro-hematuria. Faced with the presence of renal colic the approach of the general practitioner must be focused, first of all, on excluding emergencies of a surgical nature (appendicitis, extra-uterine pregnancy, ruptured aneurysm, perforated ulcer, etc.), by means of patient's case-history, a physical examination (tenderness at the costal-vertebral angle on tapping or in the lower quadrant of the abdomen), the presence or not of micro/macro-hematuria. Subsequently treatment must be begun which aims at achieving three basic objectives: treatment of the pain, removal of the calculus, safeguarding of renal function. The administration of an antispastic drug is a therapeutic choice which is only partially adequate for treating the pain; in fact this category of drugs acts exclusively on the spasm component of the pain, which is not the only algogenic cause, and which at the same time may prevent the progression of the calculus by altering urethral motility and therefore its spontaneous expulsion. For the treatment of pain in the first place, the administration of NSAIDs appears more appropriate and secondly of opiates.

The role of NSAIDs in particular is of considerable importance during the first phase of the natural progress of renal colic, in that these drugs block the events induced by the prostaglandins, such as the vasodilation of the afferent arteriole, thus reducing diuresis and consequently the intracavitary pressure; in addition by reducing the oedema and inflammation too, they lead to an attenuation of the painful symptoms and favour the progression of the calculus; the duration of their use is subordinate to the side-effects which they may produce on the gastroenteric tract and renal perfusion. The use of opiates is recommended when the effect of NSAIDs on the pain proves insufficient.

While treatment of the painful symptoms is almost always effective the expulsive aspect is much more complicated. The factors influencing expulsion of the calculus are basically the size and the location but the type of calculus and the compliance of the excretory tract also play their part. Knowing the location may be important for choosing appropriate treatment, as in the case in which the calculus is near the urethra-bladder junction: by associating an alpha-lithic drug with the NSAIDs the urethral muscles are relaxed, facilitating emission. Drinking liquids does not seem to affect the progress of the colic, even though an increase in diuresis may facilitate the progression of the calculus in cases where the obstruction is not total and the pain can be controlled pharmacologically (39-50).

By means of the anamnesis and clinical semiotics it is often possible to predict the location of the calculus and identify those situations in which the patient must be promptly sent to hospital, as in the case of a bilateral obstruction, an infected obstruction or pain which resists treatment.

The anamnesis also enables the general practitioner to gather information about family history of the disease and to assess the importance of genetic and/or environmental factors which may have determined it. By means of the anamnesis it is also possible to determine the degree of activity of the disease which in some cases presents itself as episodic and in others as seriously recurrent. Such information gives the general practitioner an idea of the degree of urgency with which to send the patient for a specialist examination.

Once past the acute phase, for an optimal clinical picture it is advisable to perform an echography of the urinary tract and a direct X-ray of the abdomen. In almost all cases the performance of these two tests enables the general practitioner to confirm the diagnosis and obtain information about the nature of the calculi present on the basis of their radio-opacity or radio-transparency; it also permits the identification of calculi along the excretory tract, a case requiring prompt urological in-

tervention since even the recovery of an asymptomatic condition after the colic does not exclude the occurrence of underlying uropathies, which may be severe (51).

The decision as to study all patients affected by nephrolithiasis from a metabolic point of view or whether to reserve such assessment only to patients with recurrent calculosis is still a matter of debate. There are in fact studies which show how patients suffering their first episode of the disease have the same incidence and severity of metabolic alterations as patients with recurrent nephrolithiasis; the first renal calculus could moreover be the first clinical sign of a systemic disease, asymptomatic until such moment, such as renal tubular acidosis (52-55) or hyper-parathyroidism (56, 57). At the Consensus Conference of the National Institutes of Health on the Prevention and Treatment of Renal Calculi (58) it was in fact decided that all patients, including those suffering their first episode of nephrolithiasis, should undergo first level metabolic assessment. On the other hand, a complete metabolic study performed on the total population of lithiasic patients, even at their first episode, is not always feasible for reasons of cost and patient compliance. It is here that the importance of a metabolic assessment at various levels, of the patient affected by nephrolithiasis comes into play, based on the number of calculi present and the number of relapses. Within the sphere of this context, it is the task of the general practitioner to make a primary assessment of the patient by means of blood tests and urine tests, simple to perform and low in cost (Table I), aimed at confirming the diagnosis, excluding the main causes of secondary renal calculosis and deciding whether or not to send the patient for further specialist advice.

In fact one of the essential tasks of the general practitioner is that of making an initial distinction between primary idiopathic calculosis, of strictly nephrological competence, and secondary calculosis.

Table I - The patient affected by renal calculosis in the General Practitioner's setting: first-level biochemical framework.

Renal function: creatininaemia, azotemia, complete urine tests, urine culture

Metabolic profile: glycemia, uricemia, lipid profile

Plasmatic electrolytes: sodium, potassium, chloride, calcium, phosphorus

Analysis of the calculus expelled (semi-quantitative method)

The assessment of any reduction of renal function in the subject affected by nephrolithiasis is important because the calculosis may be the cause; but on the other hand the deficit of concentration accompanying the reduction of the filtrate may result in an improvement of a previously active nephrolithiasis.

The assay of the humoral parameters relative to the glycolipid metabolism means that diseases such as metabolic syndrome and overweight, factors potentially favouring the presence of nephrolithiasis, may be investigated (59-69).

The assay of the plasmatic uric acid is justified by the fact that an increase in its haematic share may predispose to calculosis by increasing its urinary excretion (34-36).

The determination of calcium and phosphorus permits the exclusion, in almost all cases, of the presence of primitive hyperparathyroidism: a pathological condition of which nephrolithiasis may be the only clinical sign present at its onset (70). The assay of the plasmatic electrolytes permits investigation of clinical conditions such as hyperaldosteronism or other states of hypopotassemia: electrolytic disorders responsible for an al-

tered equilibrium between the urinary excretion of calcium and citrate. The correct performance of a standard urine test and urine culture also permits the exclusion of infections of the urinary tract as the possible cause of secondary calculosis (71-73) and provides important information on the nature of the calculosis by observing the type of crystalluria present in the sediment. Lastly, the chemical analysis of the calculi expelled (to be performed using high-precision, reliable methods, such as infrared spectrophotometry) enables determination of the composition, an important starting point facilitating the metabolic study of the subsequent level and of specialistic pertinence.

A so-called, first-level screening performed by the general practitioner must therefore consist of a general look at the patient, starting from the calculosis event and from what might be correlated to it.

The task of the general practitioner should not be limited to this first phase but remains extremely important during the subsequent diagnostic-therapeutic course of the lithiasic disease, to verify compliance with dietetic-pharmacological prescriptions and to monitor any relapses, since, as we know, nephrolithiasis may worsen over time with total absence of symptoms, sometimes with serious and irreversible effects on kidney function.

A useful contribution to the study of nephrolithiasis could come from the involvement of general practitioners in research of an epidemiological nature. He/she being the most appropriate professional figure for conducting this type of investigation, given his/her unique relationship of trust established with a definite number of patients.

Over the last decades nephrolithiasis has progressively changed from being a disease of mainly surgical pertinence to being one of multidisciplinary medical interest often requiring the intervention of various professional figures, each with their own specialistic expertise. Using the simple but effective instruments at his disposal the general practitioner can play a strategic role in simplifying and optimising the diagnostic-therapeutic course of the disease.

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