Plan To Diagnose Continuous Microhematuria

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Summary

Hematuria must always be regarded as a serious symptom demanding untiring diagnostic endeavours. To pinpoint the source of gross hematuria is usually easy but in case of microhematuria it can be difficult.

We, therefore, developed a feasible graduated Diagnostic Plan that requires interdisciplinary joint efforts because of the diversity of the causative agents responsible for hematuria. If applied in the proper methodical way this Diagnostic program will always reveal a definite diagnosis.

This Diagnostic Plan, therefore, makes possible to have the definite therapy being started with minimum suffering of the patient, waste of time and money through unnecessary diagnostic procedures.

Introduction

Hematuria should always be considered as an alarming symptom re-

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quiring vigorous diagnostic efforts. In general, the localization of the source of gross hematuria is easy, but can be difficult in microhematuria. We, therefore, developed a practicable graduated diagnostic program (Fig. 1) that demands interdisciplinary co-operation due to the variety of etiological factors causing hematuria (Table-I).

Microhematuria is defined differently by various authors: The normal limit in urinary sedimentation analysis varies between 0-2 and 0-8 red cells per high-powered field[1,3,15]. We define 0- 4 red cells to be normal, 4 - 5 red cells as equivocal and more than 5 red sells as definite microhematuria.

Basic diagnostic program

The first step of the diagnostic evaluation of microhematuria is a careful history and physical examination, the actual estimation of blood urea nitrogen and serum creatinine, repetition of urinalysis and urine cultures[8].

The basic diagnostic program should always include intravenous urogram, ultrasonic examination of the kidneys and abdomen, and cystoscopy.

It, therefore, seems to be advisable that the diagnostic evaluation of patients with microhematuria should always include the cooperation with the urologists.

Further diagnostic steps

In case, the basic diagnostic program does not deliver a definite diagnosis, two alternative further diagnostic routes can be taken:

1. If the diagnosis has not been established but a suspicion could be brought up, one or more of those further diagnostic procedures should be performed that we summed up under " additional pointed diagnostic steps".

2. If no diagnosis is suspected, the diagnostic route of what we call "extended basic diagnostic program" should be chosen.

Additional pointed diagnostic steps

First of all, this includes the computer-tomographic examination of the kidneys[5], and upper urinary tract. Angiography is indicated if computer-tomography does not reveal a definitive diagnosis, when involvement of the major renal vessels is suspected or in patients with multiple episodes of pronounced microhematuria.

In patients with known allergic reaction to contrast media, radio-isotope examinations might be an alternative, mainly when renal function is reduced. Total and split renal clearance should be determined.

When renal parenchymal or renal vascular disease is suspected per-cutaneous renal biopsy is indicated [1,2,3,5,13].

If the previous diagnostic procedures render renal pelvic, ureteric or bladder neoplasm a possible diagnosis, then urinary bladder irrigation for collection of specimens for cytological examination should be performed or brush biopsy of the renal pelvis during retrograde urogram.

Extended basic diagnostic program

If after the performance of the basic diagnostic program a diagnosis can neither be established or even suspected, the "extended basic diagnostic program" should follow.

The history should include information about hereditary diseases, exposure to certain chemical compounds[4,6,10,11,13,15], journeys to tropical countries and physical activities (Table-II).

The physical examination should concentrate on dermatological symptoms.

Laboratory examinations should include urine cytology[12], 24- hours-urine collection for estimation of calcium, uric acid and cystine, and quantitative count of red cells before and after physical stress. Bacteriological studies should include the search for trichomonas, mycoplasmas and fungi.

Serological examinations should concentrate on coagulopathies[3], parameters indicating rheumatic disease, C_3, C_4- complement reactions and electrophoresis.

If all these tests reveal negative results, percutaneous renal biopsy is indicated.

Control examinations

We recommend a repeat examination not later than 6 months in case no diagnosis could be obtained after performance of the entire diagnostic program. Since tumor growth should always be regarded as a possible diagnosis in microhematuria of unknown etiology, we advise against a prolongation of the period of time 6 months [14].

Clinical relevance of the presented diagnostic program

In the majority of cases, the performance of the presented extensive diagnostic program will ultimately reveal a definitive diagnosis. As to how the basic diagnostic program should be extended has to be decided individually for each patient, taking into account the age of the patient, the intensity of microhematuria and the potential therapeutic consequences.

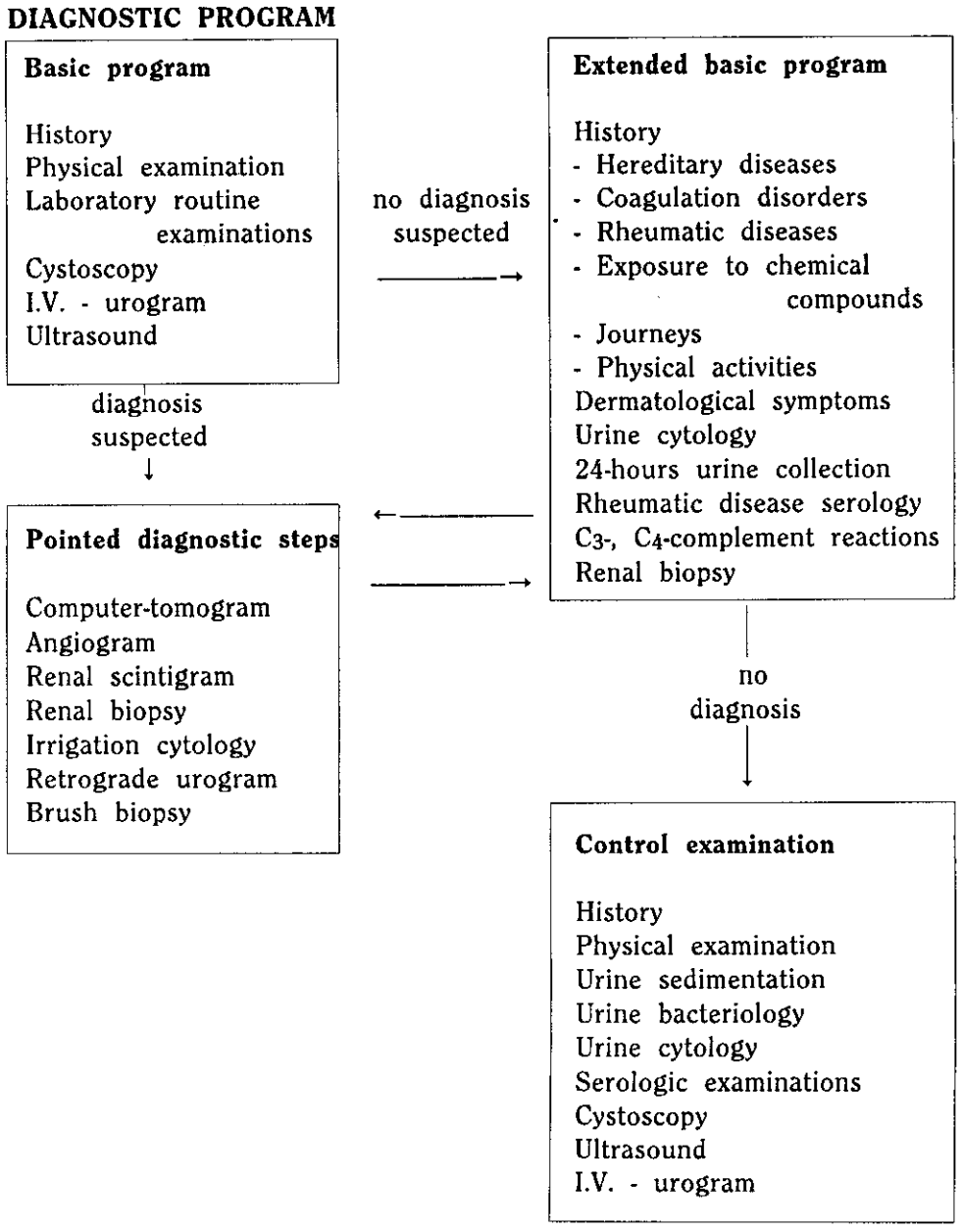
TABLE-I:
DIFFERENTIAL DIAGNOSIS OF HEMATURIA

- Inflammatory diseases
- Urinary tract obstructions
- Urolithiasis
- Trauma
- Neoplastic diseases
- Hereditary diseases
- Systemic diseases
- Vascular diseases
- Coagulation disorders
- Intoxications
- Physical stress
- Emotional stress

TABLE-II
MEDICAL AND CHEMICAL COMPOUNDS CAUSING MICROHEMATURIA

- Antibiotics
- Tuberculostatic agents
- Anticoagulants
- Fibrinolytic agents
- Diuretics
- Glucocorticoids
- Thyreostatic agents
- Cytostatic agents
- Anthelminthic agents
- Vitamin D
- Analgesics
- Psycho-pharmacological agents
- Toxic agents

FIG. 1:


DIAGNOSTIC PROGRAM
Basic program
History
Physical examination
Laboratory routine examinations
Cystoscopy
I.V. - urogram
Ultrasound
no diagnosis suspected
Extended basic program
History
- Hereditary diseases
- Coagulation disorders
- Rheumatic diseases
- Exposure to chemical compounds
- Journeys
- Physical activities
Dermatological symptoms
Urine cytology
24-hours urine collection
Rheumatic disease serology
C3-, C4-complement reactions
Renal biopsy
diagnosis suspected
Pointed diagnostic steps
Computer-tomogram
Angiogram
Renal scintigram
Renal biopsy
Irrigation cytology
Retrograde urogram
Brush biopsy
no diagnosis
Control examination
History
Physical examination
Urine sedimentation
Urine bacteriology
Urine cytology
Serologic examinations
Cystoscopy
Ultrasound
I.V. - urogram

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