A proposed minimal rheumatological screening history and examination

The joint answers back

ABSTRACT—We have developed a rapid, reliable locomotor screening procedure to identify regional locomotor problems. An initial screen was tested in general medical inpatients and modified in the light of this experience. The revised screen was subsequently restested in a similar group of patients and new referrals to a rheumatology outpatient clinic. The revised screen proved sensitive, quick, and acceptable to both patients and doctors. Such a screen could readily be adopted by undergraduates: its routine use should improve detection and awareness of rheumatological problems and form the foundation for development of rheumatological clinical skills.

There is a high prevalence of significant rheumatological disease in the community [1] and among hospital inpatients [2,3]. Routine assessment of the locomotor system would therefore be expected to form an important component of medical clerking, yet it is apparent that much significant rheumatological disease fails to be recorded in hospital inpatients [3]. There may be many reasons for this, including a low priority for rheumatology; the potential complexity of this large system; and the time taken for assessment. A quick, efficient screening procedure reliably to identify regional problems might ensure their recognition and prompt further appropriate examination and action. We have attempted to develop such a screen and to validate it.

A screening system needs to be a compromise between ease of use and sensitivity. Our initial screen took several factors into consideration. It is obviously necessary to enquire directly about symptoms and to assess everyday activities and the ability to walk. In general, a ‘normal joint’ should look normal, assume a normal position at rest, and move smoothly through a full range of movement. For screening, joint movements were therefore chosen which are recognised to be the earliest and most severely affected by arthropathy. Provocation tests, ie squeezing across the metacarpal and metatarsal heads and pressing on the belly of the supraspinatus muscle, were included to detect early polyarthritis and fibromyalgia respectively.

Methods

The study was approved by the hospital ethics committee. The initial screening procedure is summarised in Table 1. The screening procedure was then applied by one observer, the ‘minimalist’, to 100 patients on general medical and on health care for the elderly wards. To ensure that the patients were representative of those who would be routinely clerked by clinical medical students, dementia and speech problems were not excluded; the only exclusion criteria were lack of consent or critical or terminal disease.

Following examination by the ‘minimalist’ the patient was assessed blind by another observer, the ‘maximalist’, who performed a comprehensive non-structured clinical assessment to detect locomotor problems and to attribute them accurately to a region.

The sensitivities, specificities, and predictive values of the screen in detecting significant regional problems were calculated. A ‘significant problem’ was deemed by the maximalist to be any abnormal finding

Table 1. Original minimal rheumatological screen
‘Do you have any pain or stiffness in your muscles, joints or back?’
‘Can you dress yourself completely without any difficulty?’
‘Can you walk up and down stairs without any difficulty?’

Inspect patient in underwear from rear, side, and front
Examine gait
Test for bilateral mid-supraspinatus tenderness
Test lumbar flexion and ability to touch toes
Test ability to touch ear onto shoulder
Assess jaw movement (open jaw and move from side to side)
Ask patient to place both hands behind his head
Inspect hands
Assess supination/pronation of hands
Ask patient to make a fist
Assess ability to place each finger on thumb in turn
Squeeze across metacarpals and note any pain
Assess passive flexion at knee and hip
Test for ‘balloon’ sign in knee
Examine for calllosities of the sole
Squeeze across metatarsals and note any pain

ADRIAN JONES, BSc, MRCP, Research Fellow
JOANNA LEDINGHAM, BMEdSci, MRCP, Research Fellow
MARIAN REGAN, MRCP, Senior Registrar
MICHAEL DOHERTY, MA, MD, MRCP, Senior Lecturer
City Hospital, Nottingham
in the shoulder, wrist, hip, ankle, or lumbar spine. In this general medical setting the following were not considered significant: asymptomatic, non-tender Heberden’s and Bouchard’s nodes; isolated knee crepitus; hallux valgus; and isolated asymptomatic restriction of lateral flexion of the cervical spine.

Each component of the screen was then assessed for its efficiency in detecting locomotor disease. Following this analysis the minimal screen was modified in order to improve its performance (Table 2). This revised screen was then tested in identical fashion in a further 50 general medical patients. In addition, 19 patients newly referred to a rheumatology clinic were examined to broaden the spectrum of rheumatological abnormality screened. In these 19 patients the screen was applied by two minimalists to assess the coefficient of agreement between observers. The time necessary to teach this screen was assessed in six medical students who were subsequently retested after one week. The full details of the revised screen and the practicalities involved are fully detailed in the appendix.

Statistical analysis was by Mann-Whitney U test. Kappa statistics were used for repeat observations [4].

Results

The initial screen was applied to 100 patients on general medical wards (53 women, 47 men; mean age 66.9 years, range 22–98 years) with a wide spectrum of medical problems. Seventy were deemed by the maximalist to have a significant rheumatological problem. The sensitivities, specificities, and predictive values of the minimal screen for each region are shown in Table 3. Not all regions had a high incidence of problems in this general medical setting.

Several problem areas were identified with the original screen. With gait, touching toes, and questions regarding dressing and climbing stairs, many patients had difficulty in performing manoeuvres due to other medical conditions (eg cardiac or respiratory disease). Although important in determining functional impairing in individual patients, these items had in fact low sensitivity for detecting locomotor disease. The poor results obtained from asking the patient to put his hands behind his head were believed to result from lack of specification as to what constituted a normal movement, and from difficulty in performing the test in patients with hemiplegia. Passive lateral rotation of the shoulder made it possible to assess such patients. Procedures that added little extra information included testing for the balloon sign, looking for callosities, squeezing across the metatarsals and metacarpals, testing jaw and fine finger movements, hip flexion, and rear view inspection. Testing for knee crepitus was expected to improve sensitivity and has been advocated as a clinical criterion of knee osteoarthritis [5].

The screen was therefore modified (Table 2) and assessed in a further 50 medical inpatients (27 women, 23 men; mean age 64.1, range 18–94). The maximalist identified a significant locomotor problem in 26 patients (52%). The results obtained among the 19 rheumatology patients are similar both between observers and when compared to the general medical patients; therefore all results are combined when calculating sensitivities, specificities, and predictive values (Table 3).

Simply asking the question ‘Do you have any pain or stiffness in your muscles, joints or back?’ identifies 87% of the patients with significant locomotor disease with specificity, positive predictive value, and negative predictive value of 63%, 80%, and 72% respectively.

The coefficient of agreement, kappa (κ), for two observers was calculated where possible and was fair (0.21–0.40) for cervical lateral flexion and for knee crepitus; moderate (0.41–0.60) for inspection from the side, external shoulder rotation, glenohumeral crepitus, knee flexion, hip internal rotation; substantial (0.61–0.80) for inspection from the front, supraspinatus tenderness, placing hands behind the head. The time taken by two practised observers to complete the screen was generally less than two minutes (median 1min 30s, range 54s to 2min 32s), depending on the number of problems present and the time taken by the patient to undress. Only one 15-minute session was needed for teaching the screen to medical students; when retested one week later all the learners performed well.

Discussion

We chose to evaluate the screen primarily among general medical patients, for whom such a screening procedure might routinely be employed. Furthermore, in evaluating such a screen it is essential not to focus solely on patients presenting primarily with locomotor problems, and because the screen needs to be useful in patients with other major system disease we deliberately included all patients except the terminally or critically ill. The purpose of the screen is to identify joint problems that may require further consideration. The
maximalist was therefore charged not with providing a disease diagnosis but with accurately localising regional problems.

How much detail warrants inclusion in a general medical clerking, and indeed whether a systems review is advisable at all, has been the subject of discussion [6-9]. Locomotor disease is prevalent [1-3] and is frequently overlooked in patients in general medical wards [3]. Therefore, if a systems review approach is used, inclusion of the locomotor system would seem appropriate. The revised screen was designed to localise locomotor problems, and many of the functional assessments used in the original screen could be omitted without affecting this. We were surprised and even disappointed that this functional element which we had initially considered very important could be omitted from the screen. Adequate evaluation of activities of daily living is, nonetheless, an essential component of any patient assessment. A common cause of functional impairment in this study related to disease in other, often multiple, systems (ie neurological, cardiac, respiratory), and a good case can be made for its inclusion as a separate specific component of the general history and examination. However, if such evaluation has not been incorporated elsewhere, its inclusion in a locomotor screen would seem logical and convenient.

The screen proved quick and easy to perform and was considered acceptable by all patients, including those with severe disability in other systems. With a near 80% pick-up rate of significant locomotor problems we believe this screen represents a good compromise between sensitivity and acceptability. It would even seem likely that speed and ease of performance would improve when incorporated as part of a full history and examination. We are also encouraged by the ease with which the screen can be taught, and the good inter-observer agreement.

We would emphasise that inclusion of this single question and brief examination is not intended to be used as a substitute for more detailed clinical examination skills. We view this screen merely as a means of alerting the examiner to the presence and localisation of potential locomotor problems; if positive, then an appropriate more detailed locomotor examination should follow. This simple screen predominantly involves careful observation at rest and during selected movements. If incorporated into the medical ‘clockwork’ early in clinical training, it may improve patient assessment and act as a positive feedback, making the trainee more aware of the need to acquire competence in rheumatological clinical skills. In this way the ‘cries from the joint’ [3] may become more audible.

Acknowledgements

We would like to thank the patients, nursing staff, and physicians at the City Hospital, Nottingham, for all their help in this study. We are also indebted to Roussel Laboratories and the Arthritis and Rheumatism Council for financial support (J. L. is a Roussel osteoarthritis research fellow).

References

1 Royal College of General Practitioners. Morbidity statistics from general practice: 3rd National Survey (Series MB5 No 1) London: HMSO, 1981-2.
2 Spencer MA, Dixon AS. Rheumatological features of patients admitted as emergencies to acute general medical wards. Rheumatol Rehabil 1981;20:71-3.
3 Doherty M, Abawi J, Patrick M. Audit of medical inpatient examination—a cry from the joint. J Roy Coll Phys Lond 1990;24:115-8.

Table 3. The performance of the original and revised screening procedures among patients in general medical wards.

| Region/Diagnosis     | No | Sens | Spec | PPV  | NPV  | No | Sens | Spec | PPV  | NPV  |
|----------------------|----|------|------|------|------|----|------|------|------|------|
|                      |    |      |      |      |      |    |      |      |      |      |
| Soft tissue          | 5  | 20   | 100  | 100  | 96   | 8  | 63   | 100  | 100  | 96   |
| Cervical             | 7  | 100  | 34   | 10   | 100  | 18 | 94   | 50   | 33   | 97   |
| Hands                | 1  | 100  | 98   | 33   | 100  | 18 | 89   | 74   | 47   | 96   |
| Wrists               | 10 | 40   | 98   | 67   | 94   | 11 | 36   | 100  | 100  | 92   |
| Elbows               | 3  | 33   | 100  | 100  | 98   | 5  | 60   | 99   | 75   | 98   |
| Shoulder             | 22 | 32   | 99   | 88   | 84   | 27 | 89   | 90   | 80   | 95   |
| Thoracic spine       | 1  | 100  | 99   | 50   | 100  | 1  | 100  | 100  | 100  | 97   |
| Lower back           | 22 | 77   | 97   | 89   | 94   | 19 | 89   | 88   | 68   | 97   |
| Hip                  | 20 | 55   | 96   | 79   | 89   | 8  | 75   | 96   | 67   | 97   |
| Knee                 | 18 | 61   | 98   | 85   | 92   | 20 | 100  | 69   | 49   | 100  |
| Ankle                | 3  | 75   | 100  | 100  | 99   | 5  | 80   | 100  | 100  | 99   |
| Foot                 | 4  | 50   | 96   | 20   | 99   | 8  | 25   | 96   | 40   | 93   |
| Fibromyalgia         | 2  | 50   | 96   | 20   | 99   | 10 | 50   | 97   | 71   | 94   |
| Overall diagnoses    | 115| 56   | 91   | 38   | 99   | 158| 78   | 90   | 56   | 96   |

No = number of patients with problem or, in the case of overall diagnoses, number of locomotor problems; Sens = sensitivity; Spec = specificity; PPV = positive predictive value; NPV = negative predictive value.
Appendix – The screen: how to do it

1. ASK ‘Do you have any pain or stiffness in your muscles, joints or back?’

If answer positive:
(a) Ask patient to point to site of maximum intensity and to delineate area affected
(b) Inquire further as to onset, timing, progression, aggravating and relieving factors, character and duration.

Remember: if a joint looks normal, adopts a normal resting position and moves smoothly through its ranges of movement, it is probably normal.

2. Inspection from the front

Comparing one side with the other, look particularly for:
(a) muscle wasting, particularly proximal muscles
(b) inability to extend elbows fully
(c) knee deformity (varus/valgus)
(d) forefoot and midfoot deformity, alteration of foot arches
(e) swelling or skin change over any joint, especially shoulder, sternoclavicular, acromioclavicular, knee

While patient is in this position, demonstrate the required movements as you give the following instructions:

i ‘Touch your ear on each shoulder’ (Fig 1) Note ability to perform full lateral cervical flexion and excessive shrugging of the shoulders

ii ‘Place both hands behind your head with elbows back’ (Fig 2). The position shown should be achieved. This composite movement tests the glenohumeral, acromioclavicular, and sternoclavicular joints

iii ‘Place both hands out in front, palms down, fingers straight.’ Inspect for abnormalities at the distal radio-ulnar joints, wrists, metacarpophalangeal and interphalangeal joints. Look also for extensor tenosynovitis, muscle wasting, skin and nail changes.

iv ‘Turn your hands over.’ This tests proximal and distal radio-ulnar joints. Inspect the palmar surface of the hands particularly for muscle wasting, flexor tenosynovial swelling and skin changes.

3. Examination from the side

Look particularly for:
(a) normal cervical, thoracic and lumbar curvatures
(b) hip angulation (fixed flexion)
(c) knee deformity (genu recurvatum, posterior tibial subluxation and fixed flexion)

While patient is in this position, make following tests:

i bilateral mid-supraspinatus tenderness (Fig 3) by applying firm pressure as shown

ii gleno-humeral crepitus; drape the hand over the shoulder (including the anterior joint line between coracoid process and humerus) and feel for crepitus as the shoulder is passively internally/externally rotated.

iii Assess lumbar flexion (Fig 4) by distraction of fingers placed over three adjacent spinous processes as the patient flexes forward.

4. Examination on the bed

Elderly patients, particularly, may find it uncomfortable to lie totally flat; a sitting position is adequate for
screening manoeuvres. With the patient reclining comfortably, carry out the following examination:

i  Passively flex the knee and hip, feeling for knee crepitus (Fig 5)

ii From this position (Fig 5) push the ankle laterally to test internal rotation of the hip in flexion

iii Inspect the feet and soles, looking particularly for deformity, skin and nail changes, swelling and callosities.

A suggested way of recording normal examination findings in the notes might be a brief minimal statement, ie

No joint swelling, deformity
Screening movements normal
Spinal curvature normal

If not included elsewhere, comments could be added here, eg

Gait normal
Hand function normal.