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# Cancer pain: How to measure the fifth vital sign

## ■ ABSTRACT

Pain assessment is essential to good pain management and quality assurance. A pain-rating scale should be used, in combination with a thorough history and a general physical examination. Radiologic studies are an ancillary component rather than a substitute for this process. Outpatient pain diaries and hospital recordings of pain severity with the vital signs facilitate communication. Part of the goal should be to improve function and quality of life.

## ■ KEY POINTS

Pain assessment requires an extensive history and a thorough physical examination. Occasionally, ancillary studies are necessary.

Pain should be assessed during the initial evaluation, at regular intervals during treatment, and whenever new therapy is initiated to gauge the success of analgesics.

Changes in severity of pain should always be taken seriously, and patients should be encouraged to report pain without having to resort to emotional outbursts or hostility.

The routine use of pain assessment tools promotes a heightened caregiver awareness about the patient's pain and provides a means of communication between physicians and nurses.

**T**O CONTROL PAIN EFFECTIVELY in cancer patients, we need to assess it regularly and consistently, as we do vital signs. But whereas temperature, pulse, respiration, and blood pressure can be objectively measured, pain (the “fifth vital sign”) is inherently subjective.

Given this fundamental difficulty, it is no wonder that failure to properly assess pain is the most common cause of poor pain control.

In general, the health care system does a poor job of assessing pain. Few physicians consistently document the assessment of pain using visual analog scales, and fewer than 25% of patient charts contain notes of doses of opioids, rescue doses, bowel habits, or laxative use,<sup>1</sup> all of which are recommended. Recording of pain symptoms by physicians and nurses in medical records is poor.<sup>2</sup> Even when health assistants do record pain intensity, physicians often fail to start or alter analgesic therapy when indicated.<sup>3</sup>

Educating health care providers about pain is unlikely to improve outcomes unless accountability is built into the system. To this end, several organizations and experts have emphasized pain assessment,<sup>4-7</sup> notably including the Joint Commission on Accreditation of Healthcare Organizations.<sup>7</sup>

## ■ PAIN IS A MULTIDIMENSIONAL, INDIVIDUAL EXPERIENCE

Pain is multidimensional, with “sensory-discriminatory, cognitive-evaluative, and affective-motivational” components.<sup>8</sup> In other words, it affects body, mind, and spirit, and its complexity makes it hard to measure.

The relationship between pain and function and quality of life is nonlinear. If pain is

TABLE 1

**Why some patients do not complain of pain**

Fear of being perceived as a “complainer”

Fear that reporting pain will draw attention away from treating the cancer

Belief that increasing pain means progressive cancer

Belief that pain is a natural part of having advanced cancer

Fear of adverse effects of analgesics

Fear of “using up” opioids too early in the course of illness, leaving no means for relief

Worry about the cost of treatment

Wish to avoid disturbing family members

**Pain management in cancer patients is often less than optimal**

rated on a scale of 1 to 10, at pain intensities of 1 to 4 patients describe the interference with function (as reflected in daily activities and mood) as mild, at 5 to 6 they describe it as moderate, and at 7 to 10 they describe it as severe.<sup>8</sup>

Moreover, the intensity of pain expressed by patients on self-assessment scales correlates poorly with caregivers’ assessments of pain, and the greater the intensity of the pain, the poorer the correlation between patient and caregiver.<sup>9</sup> Physicians and nurses tend to underrate pain as pain intensifies, resulting in undertreatment. On the other hand, patients may underreport pain for various reasons (TABLE 1).

**■ PAIN ASSESSMENT TOOLS**

In view of these problems, it is necessary to assess pain regularly using some kind of scale or tool. Many pain-assessment scales and tools exist (TABLE 2). Each has its place in different situations in patients with cancer pain.

**Unidimensional tools**

Unidimensional pain scales, in which the patient is asked to describe the intensity of pain, are of three types:

- Visual analog (eg, the patient places a mark on a 10-cm line to indicate the intensity of pain; one end of the line is labelled “no pain” and the other “the worst possible pain,”

but the line is not otherwise labelled)

- Numeric (“please rate the intensity of pain on a scale of 1 to 10”)
- Categorical (“please rate the pain as none, mild, moderate, or severe”).

These scales are reliable and valid and can be used in conjunction with the World Health Organization (WHO) analgesic ladder guideline.<sup>10</sup> In particular, the numeric and categorical scales are easy for patients and general internists to use for assessing pain severity both in and out of the hospital. Categorical scales of graded pain severity (none, mild, moderate, and severe) are easily understood even by many patients with cognitive deficits.

**Pain relief scales, satisfaction scales, and management indices**

The unidimensional intensity scales can be modified to produce a pain relief scale, a patient pain satisfaction scale, or a pain management index.<sup>11–13</sup> The pain relief scale uses the percentage of relief by an analgesic as a measure of response and dose adjustment. The patient satisfaction scale measures the benefit derived from treatment as subjectively experienced by the patient. Patient satisfaction is related to the severity of pain, pain relief, the degree of psychologic comfort the patient has with treatment, and the patient-physician relationship. The pain management index uses a number system for pain relief and is a quantifiable measure of the qualitative response to pain.

Pain relief scales, as the name implies, gauge the relief that occurs with interventions. However, they may be misleading in that pain may be severe even though the patient has had some relief.

Pain relief scales, satisfaction scales, and management indices cannot be used interchangeably with unidimensional pain scales because the relief scales tend to indicate greater (and perhaps exaggerated) success with interventions than do simple visual analog or numeric scales.<sup>13,14</sup>

**Multidimensional pain scales**

Comprehensive multidimensional pain assessment tools such as the Brief Pain Inventory were developed to help pain management specialists measure and assess the effect of pain on



mood, activities, and quality of life—which unidimensional tools cannot do.<sup>8</sup> However, multidimensional tools are more difficult for patients to complete, and the influence of pain on daily life can also be assessed by a thorough history.

**The McGill Pain Questionnaire<sup>15</sup>** uses word descriptors to assess sensory, affective, and evaluative components of pain. Unique descriptors for the experience of pain include affective word scales that detect depression.

**The Memorial Pain Assessment Card<sup>16</sup>** has three visual analog scales and a descriptive scale patterned after the Tursky Pain Description Scale. The scales measure pain intensity, relief, and mood, and the descriptors are designed to detect psychological distress.

**The Wisconsin Brief Pain Questionnaire<sup>17</sup>** elicits a brief history of pain, medications used, and treatments, and includes a human figure on which the patient can diagram the pain. The questionnaire also includes a numeric scale for intensity, a scale for pain relief, and a categoric rating scale for the interference of pain with mood, relationships, walking ability, sleep, normal work, and enjoyment of life.

**The Brief Pain Inventory<sup>18</sup>** which is a modification of the Wisconsin Brief Pain Questionnaire, was developed as a balance between the need to assess as much as possible of the multidimensional components of pain and the need to limit respondent burden. The Brief Pain Inventory contains four questions about pain intensity, seven questions about pain-related interference, and a numeric scale to rate overall pain intensity and pain interference. It also asks the patient to diagram his or her pain.

### Quality-of-life scales

The severity, frequency, and temporal pattern of pain influence quality of life to a variable degree. Commonly used quality-of-life scales are used predominantly in research; these include:

- The Functional Living Index—Cancer<sup>19</sup>
- The Spitzer Uniscale<sup>20</sup>
- The Rotterdam Symptom Checklist<sup>21</sup>
- The QLQ-C30 of the European Organization for Research and Treatment of Cancer<sup>22</sup>

**TABLE 2**

### Types of scales commonly used to assess cancer pain

#### Unidimensional

Visual analog  
Numeric  
Categoric

#### Ancillary unidimensional

Pain relief  
Patient satisfaction  
Pain management index

#### Multidimensional

McGill Pain Questionnaire  
Memorial Pain Assessment Card  
Wisconsin Brief Pain Questionnaire

#### Quality-of-life

Functional Living Index-Cancer  
Spitzer Uniscale  
Rotterdam Symptom Checklist  
European QLQ-C30  
Functional Assessment of Cancer Therapy  
Edmonton Symptom Assessment System

- The Functional Assessment of Cancer Therapy Scale.<sup>23</sup>

Many older patients and those with reduced performance status are unable to complete these questionnaires. However, the Edmonton Symptom Assessment System<sup>24</sup> has been used routinely in some inpatient units. It was developed to assess symptoms in patients in palliative units and contains eight visual analog scales related to symptoms and pain relief.

### HISTORY AND PHYSICAL EXAMINATION

Pain assessment needs to be conducted during the initial evaluation, at regular intervals, and whenever new therapy is initiated, to gauge success.<sup>25</sup>

Accurate pain assessment is time-consuming: it requires extensive history-taking, a thorough physical examination, and sometimes ancillary laboratory studies, radiographic studies, physiologic testing, or a psychosocial history.

The goal of pain management should be clearly stated; improvement in function and activities of daily living is an important part.

**The goal of pain management should be clearly stated**

### History-taking must be thorough

The history should include the date and time the pain started, how fast it is progressing, its severity, its temporal sequence, whether it radiates, what measures relieve it, its location, and associated symptoms that clarify its pathophysiologic factors.

Ask the patient about how severe the pain usually is, and how severe it is at its worst, at its best, on average, and over the previous week.<sup>25</sup> To corroborate pain intensity, ask about how the pain interferes with lifestyle and limits daily living. Be sure to ask about breakthrough and incident pain because a separate management plan must provide for analgesics for intermittent pain.

A list of prescribed drugs, including those that are self-administered, gives valuable information about what has worked and helps avoid medications that have been ineffective.

A review of systems and a history of surgeries, psychosocial factors, comorbid illnesses, and substance abuse complete the interview.

Be sure to document doses of opioids, drugs taken for breakthrough pain, and coanalgesics, as well as bowel habits and laxative use, for future reference and for other physicians who may care for the patient in your absence.

The date of pain onset and the trajectory of pain intensity indirectly and crudely measure the course of disease. Pain of long duration and nonprogressive or diminishing intensity is likely to be nonmalignant. On the other hand, red flags for cancer progression or recurrence include failure of surgical wounds to heal or crescendo pain at the site of surgery or radiation. Similarly, failure of pain to follow an expected time course to resolution means recurrence until proven otherwise. An exception is delayed pain at a mastectomy site, which is usually—but not always—nonmalignant.

Most cancer patients experience several distinct pains at the same time, which the physician may not recognize as separate. However, the pains can be deciphered by reviewing the patient-drawn diagrams or questioning the patient closely. Questions about different pain qualities and factors that separately diminish or exacerbate each pain can help distinguish several pain syndromes in the same patient.

### Breakthrough pain must be assessed independently

Breakthrough pain is a transitory exacerbation of pain that occurs on the backdrop of stable chronic pain.<sup>25</sup> Transitory pain may be incident or spontaneous or may be attributed to end-of-dose failure. Patients with breakthrough pain usually have more intense pain, more impaired functional status, worse mood, and greater anxiety than patients without breakthrough pain.<sup>25</sup>

To treat breakthrough pain, it is essential to assess it independently of the stable chronic pain and to characterize it precisely. Independent assessment and treatment of incident pain allows physicians to tailor analgesic dosing to the pain pattern. Incident pain often requires opioid dosing independent of opioid doses used routinely for chronic pain.

### Absence of 'pain behavior' does not necessarily mean absence of pain

Patients who are demonstrative about their pain and display hostility, emotional outbursts, or anxiety are often rewarded by increases in analgesic medications, whereas stoic patients are not—even though they may be in just as much pain.

Some patients are instructed in nonpharmacologic techniques to minimize pain, perhaps getting the message that they should not report their pain. Worse, some health care professionals ignore pain in the mistaken belief that it is an unavoidable part of advanced cancer. Instead of treating the pain, some physicians focus on treating the cancer.

Any change in severity of pain should always be taken seriously, and patients should be encouraged to report pain without having to resort to overt pain behaviors.<sup>26</sup>

### Physical examination

The physical examination is guided by the hypothesis generated through the history, and should be general enough to avoid missing any relevant findings. One should not skip or abbreviate the physical examination and rely instead on radiographs or the referring physician's physical examination.

Tips for the examination:

- Eye contact and voice tone and inflection reflect the psychological state of the patient.

**Several distinct pains usually coexist in a single cancer patient**



- Skin lesions, enlarged nodes, pericardial rubs, pulmonary rales, and other findings may not be apparent on radiographs but present on physical examination.
- Ask the patient to point to an area of pain. After examining the painful area, perform maneuvers to try to elicit or ameliorate the pain to define the source and to direct further study.
- Bone metastases are the most common cause of cancer pain. It is therefore critical to examine the range of joint motion, percuss over the bony prominences and back to see if they are tender, inspect muscle symmetry, manually test muscle strength, and observe body position. Vertebral or sacral metastases may be evident by observing the patient's posture, gait, and sitting position.
- A full neurologic examination includes mental status, neuro-ophthalmologic coordination, motor performance, cerebellar coordination, and evaluation for spasticity, tremor, and rigidity. Testing of motor and sensory reflexes is done within the context of the patient's symptoms. For example, a patient with a sacral mass may have numbness around the rectum and reduced anal sphincter tone, or patients with a brachial plexopathy may have pain and numbness involving the little finger and ulnar side of the hand and will carry the arm cradled in front of them. Eventually, they will lose the triceps and biceps reflex as motor function is lost.
- Last of all, observe the patient's gait. Walking is a complex neuromuscular activity, and this observation cannot be foregone even if it has to be done within the small space of the examination room.

After completing the examination, be sure to chart the neuromuscular, neurologic, visceral, lymphatic, cardiovascular, and pulmonary system findings as a baseline for future reference.

### Laboratory tests are rarely useful

Concentrations of hemoglobin, albumin, acute-phase reactants, and prealbumin may be prognostic in advanced cancer, but this information is rarely helpful with pain assessment. Abnormal liver-function tests with right upper quadrant abdominal pain or right shoulder pain may suggest liver metastases as a

cause of pain but are too nonspecific to be a substitute for radiographic examination.

### Is an imaging study really needed?

Radiographic imaging is performed to demonstrate anatomically what is already suspected from the history and physical examination.

Before ordering any imaging study, stop and ask yourself if the patient can possibly benefit from anything that can be learned from it. Radiographic studies should be performed only if they are clinically useful and can help in generating a plan of care; the motive should be compassion, not curiosity. Terminally ill patients and those for whom all therapeutic options have been exhausted generally do not benefit from radiographic procedures. Symptom management alone is appropriate in this situation.

If the patient truly needs an imaging study, he or she should receive analgesia just before it is done: breakthrough pain is often worsened by positioning for radiographic studies.

### What type of imaging study?

Imaging studies include standard radiographs, bone scans, Doppler ultrasonography, contrast studies (including myelography, contrast bowel imaging), computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and immunoscintigraphy.

In general, one should not bypass standard radiography for more expensive procedures. On the other hand, conferring with a radiologist streamlines the diagnostic process and leads to a better interpretation and utilization of imaging studies.

Visceral imaging starts with a radiograph of the kidneys, ureters, and bladder and is followed by ultrasonography, CT, or both. Ultrasonography is noninvasive, does not require contrast, is less expensive than CT, and does not expose the patient to ionizing radiation. However, ultrasonography is operator-dependent and is not quite as sensitive or as accurate in certain clinical circumstances (eg, mechanical bowel obstruction).

MRI has few advantages for imaging the abdomen or chest, but is superior to CT for imaging the central nervous system, bones, and soft tissues. MRI offers a detailed three-

**Patients with breakthrough pain usually have the most intense pain**



dimensional image with improved diagnostic capability due to different spin-echo patterns. Patients with claustrophobia may be sedated or offered an “open” MRI machine, depending on the image quality needed. Patients with moveable metal implant devices should be excluded from MRI.

PET provides a metabolic image rather than an anatomic one. The most commonly used isotope, fluorinated deoxyglucose, is entrapped in highly anaerobic cancer and is then imaged. This method is currently approved for imaging lung cancer, colon cancer, lymphoma, and melanoma. PET scans clarify equivocal radiographic results and are appropriate for staging. However, PET is expensive and has a limited role in pain assessment because more focused procedures are indicated.

### Electrophysiologic studies

Electrophysiologic studies confirm central and peripheral neuropathic pain and myopathies. The mononeuropathies ulnar and peroneal entrapment syndrome are classified separately from brachial or lumbar plexopathies, respectively. Nerve conduction velocities, specific latencies, amplitude, duration, and configuration of sensory and motor evoked potentials identify the location of neuropathology and point to the source and severity of the underlying neuropathic disorder.

However, these studies can generate negative results if there is a significant sensory neuropathy—particularly one that affects non-myelinated fibers.

## ■ PAIN ASSESSMENT IN THE HOSPITAL

Despite validated and reliable guidelines and the availability of multiple assessment scales, pain is often undertreated in the hospital. Nurses often underestimate and underrecord pain. The routine use of pain assessment tools promotes caregiver awareness of the patient's pain and provides a means of communication between nurses and physicians. These tools also are an aid to quality-assurance programs, which may ultimately lead to overall improved patient care.<sup>27</sup>

It is possible to systematically assess pain severity and document it in patients' charts

with a high degree of compliance, and doing so results in a demonstrable decrease in pain intensity compared with patients whose pain is not routinely recorded as the “fifth vital sign.”<sup>28</sup>

Although it may be burdensome, hourly recording of patient pain reflects variations in pain severity that can be characterized as linear, curvilinear, multilinear, or nonpatterned. Patients with no consistent trend in pain ratings have greater emotional distress, social turmoil, and expressed pain behavior than patients with linear, curvilinear, or multilinear profiles.<sup>29</sup>

In giving doses of opioids for chronic and breakthrough pain, nurses are often inappropriately influenced by vital signs more than what the patient says.<sup>30</sup> This barrier can be overcome by keeping a written record of the patient's verbal reports of pain intensity, leading to appropriate analgesic dosing according to pain pattern and severity. Older patients may have difficulty expressing pain intensity by numbers, but most can use a categorical scale. Almost all patients see the benefits of daily pain assessment.

Nurses must be instructed to record present pain by consistently asking the same question, “What is your pain severity at this particular moment?” If recorded by shift, the patient should be queried about:

- Average pain
- Greatest pain during the shift
- Number and severity of incidents of breakthrough pain.

Simply asking patients about their pain at the moment of every shift change misses daily fluctuations and breakthrough pain, which if recorded would greatly influence analgesic dosing schedules.

## ■ PAIN ASSESSMENT AT HOME

To help control pain at home, patients should keep a pain diary and physicians should keep assessing pain on a regular basis.

### Why pain diaries are useful

A single assessment of pain intensity in the office is usually inadequate to gauge the overall pain experience: patients should keep a pain diary at home. Advantages:

**Bone metastases are the most common cause of cancer pain**



- Pain diaries are more accurate than a single, quantified pain assessment in evaluating pain intensity and frequency, and they authentically depict response to therapy. One's memory of pain is altered by the pain intensity at the present time, and so the patient's report in the office is commonly inconsistent with pain levels recorded in the diary.<sup>31</sup> Ratings during a 4-day period three times daily are reliable and valid.<sup>32</sup>

- Compliance with daily recording is high.<sup>33</sup>

- About 60% of patients who complete a diary improve their coping skills.<sup>33</sup> They feel empowered, they limit their phone calls to the physician to those that are essential, and they learn to communicate pain severity without resorting to overt pain behaviors.<sup>34</sup>

Pain diaries may include current and average pain intensity, pain upon rising in the morning and retiring at night, frequency and severity of breakthrough pain, and the number of daily rescue doses of analgesics. A weekly estimation of overall quality of life by the patient provides a measure of how much the pain interferes with it. The actual average pain experienced by patients is a mean of the least pain and usual pain recorded over 2 weeks.<sup>31</sup>

Pain severity can be recorded in terms of numeric, categoric, or visual analog scales, depending on the patient's preference. A baseline recording of pain intensity in excess of 30 mm on a visual analog scale is usually equivalent to moderate pain on a categoric scale.<sup>35</sup> A consistent 13-mm change in pain severity on a 100-mm visual analog scale is clinically significant.<sup>36</sup>

## Ongoing pain management

Improvement in pain tends to be incremental, and adjustments in the original dosing sched-

ule of analgesics and coanalgesics are needed. As analgesics begin to be effective, there will be improved sleep, then relief at rest, and finally acceptable pain with activities. Ongoing outpatient pain assessment requires a telephone call by a nurse or physician within 1 to 2 days of starting analgesics, a return appointment within the week, or both.

Do not assume that "no news is good news": many patients do not want to "bother" the physician. Be willing to see in short order a patient whose pain is either poorly controlled or escalating in severity. Delays lead to anxiety and hostility and worsen pain severity.

A patient whose pain was previously well controlled but is now rapidly increasing in severity has progressive disease or a complication of his or her cancer (eg, impending bone fracture, bowel obstruction). These patients need simultaneous expedited assessment and aggressive pain management that should not be delayed. It is best to assume that any new-onset pain in a patient with a history of cancer is cancer-related.

A clearly documented record of sequential assessments, analgesics, coanalgesics, laxatives, and side effects allows any physician who substitutes for the physician of record to manage the pain without repeating trials of failed analgesics or obtaining a history. Lack of documentation leads to wasted time and patient frustration. Write clear instructions about dose schedule, purpose, and guidelines for dose adjustment and telephone numbers to call if pain worsens. Both a pain diary and an analgesic schedule should accompany the patient to each outpatient appointment or hospital admission.



**Assume that any new pain in a cancer patient is cancer-related**

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