SAVE A HEART
TREAT THE PAIN

Precis: Good pain control can prevent angina, hyperlipidemia, and tachycardia

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INTRODUCTION

Although severe pain can have profound and negative impacts on the cardiovascular (CV) system, this complication has received scant attention. Pain may affect the CV system by multiple mechanisms, and sudden CV death may occur in chronic pain patients who experience a severe pain flare. One of the goals of pain treatment should be to stabilize and bring homeostasis to a pain patient's CV system. This is particularly the case with older patients who have either overt or covert cardiovascular disease or who may be at risk of developing it.

EFFECT OF BLOOD PRESSURE AND PULSE RATE

Pain causes elevation of blood pressure and pulse rate by two basic mechanisms which may simultaneously operate.1-6 (Figure One) The sympathetic (autonomic) nervous system is stimulated by electronic pain signals that reach the central nervous system. (Table One) This may occur in acute pain, during flares, or breakthrough pain. The aberrant, neuronatomic brain changes that may occur with severe constant pain appears to be capable of producing continuous sympathetic discharge.7-9 Pain also signals the hypothalamus and pituitary to release adrenocorticotropin (ACTH) which stimulates the adrenal glands to release adrenalin with subsequent elevation of pulse and blood pressure.10 Recognition of sympathetic stimulation is a useful clinical tool to help guide therapy and diagnose uncontrolled pain. Besides hypertension and tachycardia, sympathetic discharge also produces mydriasis (dilated pupil), diaphoresis (sweating), hyperactive reflexes, nausea, diarrhea, vasoconstriction (cold hands and feet), anorexia, and insomnia. (Table One)
Uncontrolled pain is hazardous in patients who have arteriosclerotic heart disease. A hallmark complication of uncontrolled pain is vasoconstriction. Consequently, a step up in heart rate and blood
pressure due to autonomic sympathetic stimulation can even be a terminal event in a patient who has existing arteriosclerotic heart disease.

To illustrate, here are two brief case reports involving patients who developed angina during pain flares and whose angina ceased once their pain was controlled.

1. A 55 year old male with long-standing neuropathy and arthritis pain due to Lyme disease was referred for pain treatment. During his initial history and physical exam it was discovered that he had known arteriosclerotic heart disease and required frequent nitroglycerine. Hospitalizations and emergency room visits totaled over a dozen in the previous one year. The patient stated that his angina only occurred during pain flares. His pain was controlled with a long acting opioid and a short-acting opioid for breakthrough pain. With this regimen he has only used nitroglycerine once in the past year, and he has not required hospitalization.

2. A 58 year old male was referred with intractable pain due to lumbar spine degeneration with spinal stenosis and radiculopathy. He was taking metoprolol for hypertension and nitro-glycerine for angina. The only time he experienced angina was when his pain flared, and he estimated this occurred about three times per week. After being stabilized on a long-acting opioid with a short-acting opioid for breakthrough pain, he has not had an angina episode for six months.

NEGATIVE IMPACT OF PAIN ON SERUM LIPIDS

Chronic pain states are known to raise serum lipids.\textsuperscript{11,12} Although the mechanism is somewhat unclear, serum cortisol elevations occur during uncontrolled pain, and elevated cortisol is known to elevate serum lipids and glucose. Although undocumented, pain as well as chronic opioid
administration may produce hypoglycemia which causes carbohydrate (sugars and starches) cravings in patients. Clinically the majority of chronic pain patients eat a diet which is overloaded with carbohydrates and which undoubtedly contributes to obesity and elevated lipids.

**CHRONIC TACHYCARDIA**

Some intractable pain patients have chronic tachycardia defined here as a pulse rate over 100 heart beats per minute. The apparent cause is continuous sympathetic discharge from rearranged neuroanatomy which imbeds the memory of pain in its circuitry.\(^7\)\(^9\) Despite aggressive opioid and other treatments such as antidepressants or benzodiazepine, the tachycardia may not abate. Severe fibromyalgia patients are particularly prone to this phenomenon. Hypertension, on the other hand, will usually respond to aggressive pain treatment. Unabated tachycardia naturally causes fatigue and insomnia.

**THERAPUETIC RECOMMENDATIONS**

Regular monitoring of blood pressure, pulse rate and other signs and symptoms of sympathetic overstimulation should be routine in pain management. (Table Three) Patients who have coronary heart disease and angina should be treated with long-acting opioids. Around the clock dosing may be essential to prevent angina and even arrhythmia or myocardial infarction. Chronic pain patients who have hyperlipidemia disorders and/or diabetes may also require around-the-clock opioid administration to prevent worsening of these diseases. Diets that minimize carbohydrates and fats should be recommended.
SUMMARY

Uncontrolled pain may elevate blood pressure, pulse rate, and adrenalin and cortisol serum levels by simultaneously stimulating the sympathetic-autonomic nervous system and release of adrenal hormones. These physiologic responses may cause hazardous stress on the CV system producing coronary spasm resulting in angina and possible death. Repetitive episodes of hypercortisolemia which occur in pain flares may elevate serum lipids and glucose. Chronic pain patients with underlying heart disease and lipid disorders may require aggressive opioid management lest these conditions worsen.

TABLE THREE

TREATMENT RECOMMENDATIONS

1. Prescribe a treatment regimen that normalizes blood pressure and heart rate.

2. Use long-acting, around-the-clock opioids to prevent angina.

3. Patients with lipid disorders and/or diabetes may require aggressive pain treatment to control lipid and glucose serum levels.

4. Recommend a diet that minimizes carbohydrates and fats.
References