

# Thiocyanate Drug Monitoring

## Indications for Ordering

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- Therapeutic monitoring in patients receiving sodium nitroprusside therapy
- Assess exposure to environmental tobacco smoke

## Test Description

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Quantitative colorimetry

## Tests to Consider

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### Primary test

[Thiocyanate, Serum or Plasma 2011575](#)

- Therapeutic monitoring
- Screen for thiocyanate poisoning

## Disease Overview

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### Physiology

- Thiocyanate may be elevated in patients with
  - Environmental tobacco smoke exposure
  - Exposure to sodium nitroprusside
- Sodium nitroprusside is used to
  - Reduce blood pressure in hypertensive crisis
  - Induce controlled hypotension to reduce bleeding during surgery
  - Treat acute congestive heart failure
- Mechanism of action
  - Relaxes vascular smooth muscle
  - Dilates coronary arteries
- Toxicity occurs more frequently with prolonged infusions and renal impairment

### Drug profile/clinical issues

- Thiocyanate is the inactive metabolite of sodium nitroprusside
- Thiocyanate can also be used as a biomarker for exposure to environmental tobacco smoke
- Metabolism
  - Ferrous ion in nitroprusside molecule reacts rapidly with sulfhydryl compounds in RBCs
    - Results in cyanide release
      - Metabolized in liver and kidney by rhodanese to thiocyanate
        - Excreted primarily in urine
- Monitoring of thiocyanate levels recommended if
  - Prolonged infusion (>3 days) or
  - Dose  $\geq 4$   $\mu\text{g}/\text{kg}/\text{min}$  or
  - Used in patient with renal impairment
- Drug/drug interactions – numerous

### Test Interpretation

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**Analytical sensitivity** – 2  $\mu\text{g}/\text{dL}$

### Results

- Therapeutic range (serum/plasma)
  - Nonsmoker – 1-4  $\mu\text{g}/\text{mL}$
  - Smoker – 3-12  $\mu\text{g}/\text{mL}$
- Values seen with nitroprusside therapy – 6-29  $\mu\text{g}/\text{mL}$
- Toxicity –  $>50$   $\mu\text{g}/\text{mL}$