Complete Summary

GUIDELINE TITLE

Rhabdomyolysis.

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Rhabdomyolysis. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2007 Apr 12 [Various].

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Finnish Medical Society Duodecim. Rhabdomyolysis. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2004 Jun 16 [Various].

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Rhabdomyolysis

GUIDELINE CATEGORY

Diagnosis
Treatment

CLINICAL SPECIALTY

Emergency Medicine
Internal Medicine
Nephrology

INTENDED USERS

Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

Evidence-Based Medicine Guidelines collect, summarize, and update the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

TARGET POPULATION

Patients having or suspected of having rhabdomyolysis

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Evaluation of signs, symptoms, and history
2. Serum creatine kinase (CK)
3. Other laboratory findings including calcium, potassium, phosphatase, serum creatinine and urine hemoglobin levels

Treatment

1. Admission to hospital
2. Correction of hypovolaemia and dehydration with physiologic saline
    - Intensive fluid therapy
    - Forced alkaline diuresis
    - Intravenous furosemide
3. Dialysis, if indicated
4. Fasciotomy, if indicated

MAJOR OUTCOMES CONSIDERED

Not stated

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The evidence reviewed was collected from the Cochrane database of systematic reviews and the Database of Abstracts of Reviews of Effectiveness (DARE). In addition, the Cochrane Library and medical journals were searched specifically for original publications.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

A. **Quality of Evidence: High**

Further research is very unlikely to change confidence in the estimate of effect

- Several high-quality studies with consistent results
- In special cases: one large, high-quality multi-centre trial

B. **Quality of Evidence: Moderate**

Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.

- One high-quality study
- Several studies with some limitations

C. **Quality of Evidence: Low**

Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate.

- One or more studies with severe limitations

D. **Quality of Evidence: Very Low**

Any estimate of effect is very uncertain.

- Expert opinion
- No direct research evidence
- One or more studies with very severe limitations

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

Aims

- Suspect rhabdomyolysis in patients with typical history (particularly those found unconscious or those who have suffered a crush injury), symptoms, and clinical findings.
- When suspicion arises, diagnosis is easy to verify (serum creatine kinase [CK]).

Definition

- Rhabdomyolysis refers to an injury of striated muscle. It may result in acute renal failure unless treatment is instigated early enough.

Aetiology

- The most common causative factor is lying unconscious on a hard surface either as a result of intoxication (alcohol or medication), or due to an illness. The long lasting pressure will cause muscle damage.
- Crush injury, excessive muscle strain (running, body building, etc.), and convulsions
- Alcohol and illegal drugs (heroin, cocaine)
- Medication (statins)
- Hyperthermia (malignant hyperthermia, neuroleptic malignant syndrome)
- Metabolic disorders (hyperosmolar coma, ketoacidosis, hypokalaemia, hypophosphataemia)
- Infections (pneumococcus, salmonella, legionella, influenza, cytomegalovirus)
- Myopathy (congenital muscle enzyme deficiency, alcohol)

When to Suspect?

- A typical history involves a patient
    - Who has been lying unconscious on a hard surface due to excess alcohol, medication, or another reason, or
    - With excessive muscle strain over the preceding hours or days
- Signs and symptoms:
    - The affected area (limbs, buttocks, back) is painful, swollen, or tender to touch.
    - The patient may be unconscious, confused, dehydrated, or febrile.
    - Paresis or sensory disturbance may be present in the limbs (increased compartment pressure).
    - Urine may be dark (myoglobin), or the patient may be oliguric or anuric.
- Urine strip test may be positive to haematuria (due to myoglobin), even when no red cells are seen in the sediment.

Diagnosis

- If rhabdomyolysis is suspected, measure serum creatine kinase.
- CK activity is often >10,000-100,000 U/L.
- In clinical practice, the measurement of other muscle enzymes is not needed.
- Other typical laboratory findings include:
    - Hypocalcaemia (calcium deposited in muscle tissue)
    - Hyperkalaemia
    - Hyperphosphataemia (renal failure and release from cells)
    - Urine hemoglobin (Hb) positive in approximately 50% of patients
    - Increased serum creatinine as renal failure develops
- Differential diagnosis: Local symptoms may resemble those of deep venous thrombosis.

Treatment

- The patient is usually admitted to hospital.
- In primary care the first aid consists of the correction of hypovolaemia and dehydration.
    - Start with physiological saline

        - 1,000 milliliters(mL) during the first hour
        - Followed by 400-500 mL/hour
    - The aim is to prevent the development of acute renal failure, caused by myoglobin which is being released from the muscles.
- In the hospital the follow-up treatment consists of the following:
    - Correction of dehydration to maintain diuresis. Intensive fluid therapy is the cornerstone of the treatment. Forced alkaline diuresis aims at preventing renal failure; target level for urine pH is 6.5. In the recent years, the importance of urine alkalinization has, however, been questioned (Homsi et al., 1997; Brown et al., 2004).
        - Initially 1,000 mL of 0.9% sodium chloride (NaCl) over 1 hour
        - Followed by 0.3% NaCl with 5% glucose 400 mL/hour
        - Urine is alkalinized with a side infusion of 1.4% sodium bicarbonate (NaHCO3) administered 50-100 mL/hour, or 7.5% NaHCO3 administered 10-20 mL/hour.
        - Diuresis may be encouraged with 20-40 milligrams of intravenous furosemide.
    - Dialysis is indicated in renal failure if the patient is anuric and diuresis is not induced with rehydration.
        - Dialysis will have no effect on the renal state, but will keep the patient alive until renal function spontaneously returns. This may take several days, even weeks.
    - Fasciotomy is indicated if increased compartment pressure threatens to cause muscle necrosis or nerve damage.
    - Correction of symptomatic hypocalcaemia must be carried out cautiously, because hypercalcaemia often develops during recovery. Asymptomatic hypocalcaemia requires no treatment.

Prognosis

- Prognosis is good even in cases where renal failure has developed, since the failure is reversible.
    - If compartment syndrome is not treated early enough, residual nerve and muscle damage may persist.

Related Resources

Refer to the original guideline document for related literature.

Definitions:

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CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Accurate diagnosis and appropriate treatment of rhabdomyolysis
- The aim of treatment is to prevent the development of acute renal failure.

POTENTIAL HARMS

Not stated

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2004 Jun 16 (revised 2007 Apr 12)

GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

SOURCE(S) OF FUNDING

Finnish Medical Society Duodecim

GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Author: Heikki Saha

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

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GUIDELINE AVAILABILITY

This guideline is included in a CD-ROM titled "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

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