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Immediate telephonic alerting of deviating pharmacological test results

OPINIONS

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An overview is now available of instances where laboratories should immediately alert clinicians to deviating pharmacological test results when the patient's life and health may be at risk.

In certain cases when analyses of drugs or other foreign substances such as methanol are requisitioned, the serum concentration in the patient deviates to such a degree that it might represent a risk to life and health. In such cases the laboratory should alert the treating doctor by telephone. These thresholds are defined as 'laboratory alert levels'. The large variation between laboratories and wishes expressed by individuals in the medical community have highlighted a need for harmonisation of these thresholds across all Norwegian laboratories.

The board of the Norwegian Society of Clinical Pharmacology therefore appointed a working group (1). The group was composed of a broad range of representatives from the clinical pharmacological communities in Norway, and its aim was to reach a consensus on the recommended alert levels for the pharmacological analyses most frequently offered in Norway (2). A comprehensive report has now been published on *farmakologiportalen.no* and provides an overview of the background for the recommended thresholds (3, 4).

Proposals for the recommended alert levels were drawn up through literature searches and several consultation rounds. Clinical pharmacological laboratories as well as clinicians in various medical specialties were included. The recommendations are presented in Table 1, which is intended particularly as a tool for laboratories where clinical pharmacological expertise is not immediately available. The recommendations are for guidance only, and local adaptations may be necessary.

Table 1

The working group's recommended alert levels for 20 of the most frequently offered pharmacological substances in Norway.

Substance	Unit of measurement	Threshold[1, 2]
Cyclosporin	µg/l	≤ 50
Digitoxin	nmol/l	≥ 30
Digoxin	nmol/l	≥ 2.6
Ethanol	‰	None Children under 5 years: All
Ethylene glycol	mmol/l	All[3]
Phenobarbital	µmol/l	≥ 200
Phenytoin	µmol/l	≥ 100
Gentamicin	mg/l	None
Isopropanol	mmol/l	All[3]
Carbamazepine	µmol/l	≥ 60
Lithium	mmol/l	≥ 1.5
Methanol	mmol/l	All[3]
Methotrexate	µmol/l	≥ 10 Dosage 1 x per week: ≥ 0.1
Paracetamol	µmol/l	≥ 500
Salicylic acid	mmol/l	≥ 4 Children under 12 years: ≥ 3.5
Tacrolimus	µg/l	≤ 3
Theophylline	µmol/l	≥ 110
Tobramycin	mg/l	None
Valproate	µmol/l	≥ 900
Vancomycin	mg/l	None

[1]Unless a clinical pharmacologist undertakes another assessment

[2]Unless another agreement has been made with the requisitioning doctor

[3]Negative results may also be important with regard to differential diagnostics

Some specific issues

We do not recommend alerting serum concentrations of the antimicrobial drugs gentamicin, tobramycin and vancomycin. Treatment with these drugs is generally undertaken in hospital, where the analysis results are available within

a relatively short period and routinely followed up by those responsible for the treatment. Specific routines for alerting are therefore not considered to be necessary.

For the toxic alcohols (ethylene glycol, isopropanol and methanol) we recommend alerting of all positive samples. Alerting of negative test results may also be considered as part of local practices, since these may be important with regard to differential diagnostics.

In our internal assessment and our discussions with the various clinical communities, we have not arrived at a general recommendation with regard to alerting of ethanol. Due to considerable individual differences in tolerance and vulnerability to ethanol, the threshold for when a given ethanol concentration represents a potentially serious poisoning will be highly variable. We have therefore concluded that on a general basis, we would not recommend alerting except for children under five years of age, for whom all positive test results should be alerted.

For the immunosuppressive drugs (cyclosporin and tacrolimus), subtherapeutic concentrations entail an increased risk of rejection reactions in transplant patients. This risk increases with lower concentrations. The duration of the subtherapeutic phase also has an effect. The working group therefore believes that the most rational approach is to set a lower alert level for these substances.

We hope that these recommendations will encourage a more unified national practice for alert levels.

LITERATURE

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