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Congenital cataracts, facial dysmorphism and neuropathy syndrome

Hermansky-Pudlak syndrome

orphanaesthesia

a project of the German Society
of Anaesthesiology and Intensive Care Medicine

SUPPLEMENT NR. 15 | 2023

OrphanAnesthesia –
ein krankheitsübergreifendes Projekt des Wissenschaftlichen Arbeitskreises Kinderanästhesie der Deutschen Gesellschaft für Anästhesiologie und Intensivmedizin e.V.

Ziel des Projektes ist die Veröffentlichung von Handlungsempfehlungen zur anästhesiologischen Betreuung von Patientinnen und Patienten mit seltenen Erkrankungen. Damit will OrphanAnesthesia einen wichtigen Beitrag zur Erhöhung der Patientensicherheit leisten.

Patientinnen und Patienten mit seltenen Erkrankungen benötigen für verschiedene diagnostische oder therapeutische Prozeduren eine anästhesiologische Betreuung, die mit einem erhöhten Risiko für anästhesieassoziierte Komplikationen einhergehen. Weil diese Erkrankungen selten auftreten, können Anästhesistinnen und Anästhesisten damit keine Erfahrungen gesammelt haben, sodass für die Planung der Narkose die Einholung weiterer Information unerlässlich ist. Durch vorhandene spezifische Informationen kann die Inzidenz von mit der Narkose assoziierten Komplikationen gesenkt werden. Zur Verfügung stehendes Wissen schafft Sicherheit im Prozess der Patientenversorgung.

Die Handlungsempfehlungen von OrphanAnesthesia sind standardisiert und durchlaufen nach ihrer Erstellung einen Peer-Review-Prozess, an dem eine Anästhesistin bzw. ein Anästhesist sowie eine weitere Krankheitsexpertin bzw. ein weiterer Krankheitsexperte (z. B. Pädiaterin bzw. Pädiater oder Neurologin bzw. Neurologe) beteiligt sind. Das Projekt ist international ausgerichtet, sodass die Handlungsempfehlungen grundsätzlich in englischer Sprache veröffentlicht werden.

Ab Heft 5/2014 werden im monatlichen Rhythmus je zwei Handlungsempfehlungen als Supplement der A&I unter www.ai-online.info veröffentlicht. Als Bestandteil der A&I sind die Handlungsempfehlungen damit auch zitierfähig. Sonderdrucke können gegen Entgelt bestellt werden.

Bisher in A&I publizierte Handlungsempfehlungen finden Sie unter:

www.ai-online.info/Orphsuppl
www.orphananesthesia.eu

OrphanAnesthesia –
a project of the Scientific Working Group of Paediatric Anaesthesia of the German Society of Anaesthesiology and Intensive Care Medicine

The target of OrphanAnesthesia is the publication of anaesthesia recommendations for patients suffering from rare diseases in order to improve patients' safety. When it comes to the management of patients with rare diseases, there are only sparse evidence-based facts and even far less knowledge in the anaesthetic outcome. OrphanAnesthesia would like to merge this knowledge based on scientific publications and proven experience of specialists making it available for physicians worldwide free of charge.

All OrphanAnesthesia recommendations are standardized and need to pass a peer review process. They are being reviewed by at least one anaesthesiologist and another disease expert (e.g. paediatrician or neurologist) involved in the treatment of this group of patients.

The project OrphanAnesthesia is internationally oriented. Thus all recommendations will be published in English.

Starting with issue 5/2014, we'll publish the OrphanAnesthesia recommenations as a monthly supplement of A&I (Anästhesiologie & Intensivmedizin). Thus they can be accessed and downloaded via www.ai-online.info. As being part of the journal, the recommendations will be quotable. Reprints can be ordered for payment.

Find a survey of the recommendations published until now on:

www.ai-online.info/Orphsuppl
www.orphananesthesia.eu

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Anaesthesia recommendations for

Congenital cataracts, facial dysmorphism and neuropathy syndrome

Disease name: Congenital cataracts, facial dysmorphism and neuropathy syndrome

ICD 10: Q87.8

Synonyms: CCFDN syndrome

Disease summary: The congenital cataracts, facial dysmorphism and neuropathy (CCFDN) syndrome is an extremely rare autosomal recessive disorder with unknown prevalence. This multiorgan disorder is typically described in Roma ethnicity. The first case was described in 1999 in Roma patients from Bulgaria. It is caused and diagnosed by a mutation in CTDP1 gene on chromosome 18q23. This mutation causes an altered transcription process, affecting many cellular processes and functions. The clinical manifestation of the CCFDN syndrome is similar to that of the Marinesco-Sjögren syndrome, but molecular testing has already shown that these syndromes are different. Disease abnormalities include ophthalmic problems, especially bilateral congenital cataract, nystagmus or microcornea, facial dysmorphism with micrognathia, mild development delay, musculoskeletal deformities caused by demyelinating peripheral neuropathy and hypogonadism. These patients undergo ophthalmic surgery of cataracts, corrective orthopaedic surgery like scoliosis or extremities correction. Perioperative management includes close anaesthetic monitoring, postoperative care in ICU is appropriate, except for short noncomplicated surgery, due to potentially life-threatening complications like epileptic seizures, rhabdomyolysis, pulmonary oedema or inspiratory stridor. The main postoperative complication of patients with CCFDN syndrome is rhabdomyolysis, so we should limit using volatile anaesthetics and depolarising muscle relaxants. Total intravenous anaesthesia, eventually nondepolarising muscle relaxants, are preferred.

Medicine is in progress

Perhaps new knowledge

Every patient is unique

Perhaps the diagnosis is wrong

Find more information on the disease, its centres of reference and patient organisations on Orphanet: www.orpha.net

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Typical surgery

Most frequent procedures include ophthalmic surgery, typically cataract, orthopaedic surgery like scoliosis or extremities correction and tendon transfers. Rarer procedures are corrections of gonad abnormalities.

Type of anaesthesia

Both kinds of anaesthesia, general or regional anaesthesia, are possible. General anaesthesia is the preferred method for a patient suffering from mental retardation and poor compliance.

The specific contraindications for regional anaesthesia associated with CCFDN syndrome are unknown, there is just one published report about regional anaesthesia in these patients. Ultrasound-navigated peripheral blocks are useful as part of postoperative analgesia, but cannulation can be difficult due to deviant anatomical proportions in patients with musculoskeletal deformations.

General anaesthesia is a method of choice in patients with altered mental status. Depolarising muscle relaxants and volatile anaesthetics should be limited. A high risk of severe rhabdomyolysis and hyperkalaemia has been described. However, rhabdomyolysis is probably triggered by stress and ineffective postoperative pain control. Inhalational induction of anaesthesia may be considered in case of a difficult IV access to reduce patient stress. The best choice consists in total intravenous anaesthesia, eventually with non-depolarising muscle relaxants in case of intubation or to facilitate surgery. Rocuronium and sugammadex administration is the preferred combination for neuromuscular blockade control, as there is a potential to full recovery from the neuromuscular blockade. There are unconvincing data about malignant hyperthermia, but the association with malignant hyperthermia is unlikely due to the separate gene localisations of these disorders.

Analgosedation is not contraindicated, but should be considered in each individual case, especially if patients display altered respiratory functions due to scoliosis, mental retardation or muscular weakness. In addition, facial dysmorphism, specifically mandibular hypoplasia can cause upper airway obstruction after sedation.

Necessary additional preoperative testing (beside standard care)

The spectrum of preoperative assessment should be considered individually according to the severity of symptoms and the type of surgery. The CCFDN syndrome is characterised by a demyelinating peripheral neuropathy with skeletal muscle weakness. It can result in scoliosis with an alteration of cardiopulmonary functions. Pre-anaesthesia evaluation should focus on the signs of difficult airway management in the first place and on the identification of cardiovascular and pulmonary disorders and neurological deficits, respectively muscle weakness.

Cardiovascular assessment includes electrocardiography. There are no data on serious cardiac disease, but in cases of doubt (severe scoliosis), echocardiography should be considered.

Respiratory function evaluation should be considered in patients with severe muscular weakness or severe scoliosis. It includes arterial blood-gas analysis and spirometry. This

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testing can be complicated by the noncompliant patient with mental retardation, but it can be helpful for predicting the need for postoperative ventilatory support.

Neurological examination is recommended in patients with neurological deficit, severe muscle weakness, extremity deformations and before spine surgery. In addition, it can be helpful for juridical reasons in these patients for a clear description of neurological deficit in case of possible iatrogenic harm of patients.

Particular preparation for airway management

The CCFDN syndrome is a multiorgan disorder. Facial dysmorphism is a typical sign of this syndrome, especially in late childhood or adult males. Dysmorphism is presented by a prominent nasal philtrum with upper incisors, thickening of the perioral tissues and micrognathia. Two studies reported of different types of airway securement. A laryngeal mask was used in the case first published, endotracheal intubation in the second. Both cases did not report of problems with bag-mask ventilation or airway securing.

There are no more data about airway securing. As there is a possibility of difficult airways due to facial dysmorphism, equipment for difficult airway management should be available before every anaesthetic care.

Particular preparation for transfusion or administration of blood products

Data on transfusion management have not been published. A higher blood loss and a need for blood products must be expected in patients with CCFDN syndrome during invasive procedures, e.g., spine surgery or extremities correction. Some data presented higher blood losses in patients with a neuromuscular disorder compared to patients without any neuromuscular deficit. Osteoporosis might be accountable for the higher blood loss in these patients.

Particular preparation for anticoagulation

There is no case about thrombotic complications that has been reported in the literature. Recommendations for an anticoagulation therapy is not available. But higher risks of thrombosis in patients with limited mobility may be expected. In these patients we should consider the risk-benefit ratio of anticoagulation during the perioperative period.

Particular precautions for positioning, transportation and mobilisation

CCFDN syndrome patients might suffer from osteoporosis due to peripheral neuropathy with a low mobility level or endocrine deficiency. There is a higher risk of iatrogenic injury in these patients. It is recommended to use specific positioning pads in these patients, especially in the prone position.

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Interactions of chronic disease and anaesthesia medications

Not reported.

Anaesthetic procedure

Regional anaesthesia, neuraxial techniques including, are possible with respect to the mental status of these patients. However, regional techniques can be combined with general anaesthesia. There is no specific approach, but there could be different anatomical proportions in patients with neuromuscular disease. Ultrasound is the preferred method for regional anaesthesia navigation.

General anaesthesia is preferred in a patient with severe mental alteration. Total intravenous anaesthesia is a method of choice.

Volatile anaesthetics and depolarising muscle relaxants should be limited. There is a higher risk of hyperkalaemia and rhabdomyolysis.

Non-depolarising muscle relaxants can be used in patients with CCFDN syndrome. We recommend neuromuscular blockade monitoring due to the higher risk of a prolonged neuromuscular blockade.

A good pain control will prevent the risk of an excessive stress reaction and rhabdomyolysis. Regional anaesthesia and paracetamol have been used without complications.

Particular or additional monitoring

Depth of anaesthesia should always be monitored during TIVA. It can reduce the total dose of anaesthetics, and it shortens the time of recovery from anaesthesia.

We should always monitor the depth of neuromuscular blockade. There is a risk of prolonged neuromuscular blockade in patients with demyelinating peripheral neuropathy.

Invasive blood pressure monitoring is recommended in more extensive surgery, major fluid shifts or in patients with altered cardiovascular functions.

Possible complications

Patients with the CCFDN syndrome have a higher risk of rhabdomyolysis. Volatile anaesthetics should be limited. A potential rhabdomyolysis can be detected postoperatively by myoglobinuria monitoring.

Other complications have been described, e.g., seizures, pulmonary oedema or inspiratory stridor. These complications should be treated according to respective standards.

A peripheral neuropathy could result from a prolonged neuromuscular blockade. A residual neuromuscular blockade might impair recovery.

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Postoperative care

Postoperative monitoring depends on the type of surgical procedure and the patient's comorbidities. Intensive care should be provided in high-risk surgeries to patients with a disability of high degree.

The potential rhabdomyolysis can be detected postoperatively by myoglobinuria monitoring.

Patients could profit from early weaning and mobilisation after surgery. Immobilisation can worsen the neuropathy and the outcome after surgery.

Disease-related acute problems and effect on anaesthesia and recovery

There are limited data about airway management. Difficult airways should always be expected as a result of facial dysmorphism.

There are unconvincing data about malignant hyperthermia. But an association with malignant hyperthermia is unlikely because of the separate gene localisations of the CCFDN syndrome and malignant hyperthermia.

Ambulatory anaesthesia

Not reported.

Obstetrical anaesthesia

Not reported.

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