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**Recessive myotonia congenita
(Becker's disease)**

Wolf-Hirschhorn syndrome

orphan**a**nesthesia

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

SUPPLEMENT NR. 14 | 2019

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 Patienten mit seltenen Erkrankungen. Damit will OrphanAnesthesia einen wichtigen Beitrag zur Erhöhung der Patientensicherheit leisten.

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 Anästhesisten damit keine Erfahrungen gesammelt haben, so dass 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 ein Anästhesist sowie ein weiterer Krankheitsexperte (z.B. Pädiater oder Neurologe) beteiligt sind. Das Projekt ist international ausgerichtet, so dass 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.

OrphanAnesthesia –

a common 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 recommendations 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.

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orphananesthesia

Anaesthesia recommendations for Wolf-Hirschhorn syndrome

Disease name: Wolf-Hirschhorn syndrome

ICD 10: Q 93.3

OMIM: 194190, 602618, 602952, 604407, 605032, 605032, 605830, 606026

Synonyms: 4p deletion syndrome, 4p-syndrome, del (4p) syndrome, monosomy 4p, partial monosomy 4p, WHS

Disease summary: The disease was first described by Hirschhorn and Cooper in 1961, the second case was published in 1965 by Wolf et al. Wolf-Hirschhorn syndrome (WHS) is a rare congenital disorder with specific clinical features mostly caused by de novo microdeletion of the distal short arm of chromosome 4 (del 4p 16.3) involving the Wolf-Hirschhorn candidate gene (WHSC1 and WHSC2), but depending on the size of the deletion other genes can be involved as well (NELFA, LETM1, PIGG, CTBP1, FGFR1, MSX1), explaining the variability of clinical features. Only 10 % are caused by translocation. The Pitt-Rogers-Danks syndrome (another 4p deletion syndrome) is often considered as a mild clinical variation of WHS.

Typical clinical features (modified from Bösenberg [9]):

Incidence > 75%:

Typical facial feature of "Greek warrior helmet" appearance (prominent glabella extending into the broad bridge of the nose, high forehead), microcephaly, low set ears, intrauterine growth retardation, slow postnatal weight gain, failure to thrive, muscular hypotonia, seizures, febrile convulsions, typical EEG abnormalities, mental disability of variable degree.

Incidence 50–75%:

Skeletal abnormalities such as scoliosis, congenital hip dislocation or clubfeet, craniofacial asymmetry, ptosis, microstomia, micrognathia, abnormal teeth, IgA or IgG2 deficiency.

Incidence 25–50%:

Hearing loss, heart defect (mainly atrial or ventricular septal defect), eye or optic nerve anomalies, cleft lip and palate, genitourinary tract anomalies, structural brain anomalies, stereotypies (hand flapping, head-shaking, rocking etc.).

Incidence < 25%:

Other anomalies concerning the liver, gallbladder, gut, diaphragm, oesophagus, lung and aorta, malignancies of the liver or the haematopoietic system.

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The prevalence of the WHS is estimated at 1:20 000–1:50 000 births with a 2:1 female to male ratio. The severity of the phenotypic manifestation of WHS correlates with the amount of chromosomal deletion. The mortality rate is about 30% within the first two years of life, mainly due to aspirations leading to pulmonary infections or due to epileptic seizures. The seizures are often difficult to control, but tend to decline with age.

Congenital heart defects are usually not complex.

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

Typical surgery

Gastrostomy tube placement, fundoplication for gastroesophageal reflux disease, repair of cleft palate, cardiac surgery, tympanoplasty, myringotomy, hypospadias correction, cystoscopy, dental examination, orthopaedic surgery for foot and hip correction.

Type of anaesthesia

Successful perioperative management has been reported with both inhalational and total intravenous anaesthesia in patients with WHS. However, two case reports describe an association between WHS and malignant hyperthermia, one of them with delayed onset. Children with WHS often present with infections, therefore perioperative hyperthermia could have other aetiologies. Association of malignant hyperthermia with WHS is unproven (no contracture tests performed, no ryanodine receptor genetically involved) and very unlikely as the generalised hypotonia is not caused by a muscle disease.

Regional anaesthesia like thoracic epidural anaesthesia for fundoplication is reported, but special care should be taken in case of vertebral abnormalities like scoliosis.

Necessary additional pre-operative testing (beside standard care)

A thorough history and examination of the patient is important, as many organ systems (see above) can be involved. Careful evaluation of the airway patency (mouth opening, retrognathism) is essential. In case of congenital cardiac disease, ECG and echocardiography are necessary to evaluate the cardiac function. Blood coagulation and thrombocyte function should be checked if the patient receives valproate therapy, thrombelastography might be useful. Seizures should be well controlled by antiepileptic therapy. Therapeutic anticonvulsant levels should be checked before procedure.

Particular preparation for airway management

Due to craniofacial deformities, equipment for difficult airway management must be prepared. Mouth opening should be carefully evaluated as supraglottic devices and videolaryngoscopes require a minimum free interincisor distance to be introduced in the mouth. Radiographies of the cervical spine may be useful to evaluate the airway. A nasopharyngeal airway should be available. Some reports also mention successful conventional intubation without difficulties. A higher risk of aspiration and susceptibility to airway infections should be kept in mind. The size of the endotracheal tube should be chosen one size smaller than calculated per age due to growth retardation.

Particular preparation for transfusion or administration of blood products

If the patient has IgA deficiency, he might be at risk of allergic or anaphylactic reactions when receiving a transfusion with a plasma-containing blood product.

Particular preparation for anticoagulation

Coagulation disorders can develop in case of therapy with valproic acid. Careful review of coagulation parameters is recommended, as valproic acid influences both thrombocyte function (acquired von Willebrand's disease) and coagulation factors (fibrinogen). Therapy according to the laboratory test results is recommended in case of operations with anticipated significant blood loss, if valproic acid cannot be replaced.

Particular precautions for positioning, transportation and mobilisation

Careful attention to intraoperative patient positioning is indicated in case of skeletal deformities like kyphosis, scoliosis or hip dysplasia.

Interactions of chronic disease and anaesthesia medications

Most patients are under antiepileptic therapy, which should be continued throughout the perioperative period. Anticonvulsant medications should be given the morning of the procedure either by oral administration or by intravenous route. The anaesthetist must keep in mind possible pharmacological interactions. Especially older antiepileptic drugs like carbamazepine, phenobarbital, phenytoin induce hepatic enzymes leading to decreased plasma concentrations of many medications. Valproate is an inhibitor of microsomal hepatic enzymes and decreases the metabolism of many medications.

Anaesthetic procedure

As WHS patients tend to be less cooperative and hearing loss is common, the presence of a parent/caregiver is very helpful during induction of anaesthesia. If necessary, a pre-medication may be given carefully as the patient can be very sensitive and respiratory complications may occur. Successful inhalational inductions are described, but it should be kept in mind that patients with WHS often present with gastroesophageal reflux disease. The plan for management of the potentially difficult airway must be balanced carefully against the increased risk of aspiration.

Recurrent respiratory infections may lead to airway hyperreactivity during all phases of anaesthesia (induction, maintenance and awakening). Difficulties of ventilation and increased peak airway pressure may occur. The use of sevoflurane and bronchodilators can be helpful.

Doses of neuromuscular blocking agents should be titrated to effect when the patient presents with generalised hypotonia.

Regional anaesthesia may be applied using ultrasound guidance as malformations of the bony system are common.

Particular or additional monitoring

According to the severity of cardiac disease, appropriate non-invasive and invasive haemodynamic monitoring should be planned for the surgical procedure.

Temperature monitoring is advisable to detect hyperthermia whether caused by infections or, unlikely, malignant hyperthermia.

Careful neuromuscular monitoring is recommended as hypotonic WHS patients probably have increased sensitivity to neuromuscular blocking drugs.

Possible complications

Respiratory complications as pulmonary infection, aspiration pneumonia and atelectasis are common.

Prolonged duration of neuromuscular blocking agents is possible.

Perioperative seizures can occur if the patient has a history of severe convulsion disorder.

Hyperthermia should be treated promptly to avoid febrile seizures.

Post-operative care

Continuous respiratory monitoring is recommended until the patient is fully awake and stable. Prolonged surveillance is advisable due to possible complications as mentioned above.

Disease-related acute problems and effect on anaesthesia and recovery

If intra- or postoperative hyperthermia occurs, there are many differential diagnoses to be considered: infections, malignant hyperthermia, iatrogenic overheating, drug-induced fever etc.

Ambulatory anaesthesia

Usually may not be advisable. In case of mild presentation of the disease and very short procedure, ambulatory anaesthesia may be considered on an individual base.

Obstetrical anaesthesia

No reports found.

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