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The use of hyperbaric oxygen therapy in the treatment of hemorrhagic cystitis after allogeneic stem cell transplantation from an unrelated donor

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Abstract

Hemorrhagic cystitis (HC) is a diffuse inflammation of the bladder of an infectious or non-infectious etiology, causing bleeding of the bladder mucosa. There are no explicit guidelines defining the appropriate treatment of HC. Hyperbaric oxygen therapy (HBO) is a non-invasive method involving the use of 100 % oxygen under increased pressure, which penetrates to poorly perfused areas. The most appropriate group for treatment with HBO is patients with BK virus-associated HC after allogenic human stem cell transplantation (alloHSCT). In this report, we present five patients after alloHSCT from a matched unrelated donor with symptoms of HC successfully treated with HBO. All patients received therapy with 100 % oxygen in a hyperbaric chamber at 2.5

atmospheres for 60 min, delivered 5 days per week. Complete response with resolution of pain and hematuria, as well as eradication of viral load, was achieved by all the patients after a mean of 13 sessions (range 11-30) of HBO. These data indicate that HBO therapy is sufficient and effective in the treatment of HC, and represents a well-tolerated procedure with good clinical and laboratory results after ineffective primary treatment.

Case Reports

Leuk Res

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Hyperbaric oxygen therapy in BKV-associated hemorrhagic cystitis refractory to intravenous and intravesical cidofovir: case report and review of literature

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Abstract

Hemorrhagic cystitis is a common complication in hematopoietic stem cell transplant recipients. We report here a case of severe BKV-associated hemorrhagic cystitis who did not respond to intravenous cidofovir. Overt hematuria successfully resolved after a few days on hyperbaric oxygen and intravesical instillations of cidofovir, while BK viruria dropped after a few weeks and remained low. We review the literature for therapeutic options in hemorrhagic cystitis and try to explain how hyperbaric oxygen stimulates mucosal repair in the urinary bladder.

Successful hyperbaric oxygen therapy for refractory BK virus-associated hemorrhagic cystitis after cord blood transplantation

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Abstract

BK virus-associated hemorrhagic cystitis (BKV-HC) is a common and major cause of morbidity in recipients of allogeneic hematopoietic stem cell transplantation. A 32-year-old woman developed severe BKV-HC on day 24 after cord blood transplantation (CBT). Despite supportive therapies - such as hyperhydration, forced diuresis, and urinary catheterization - macroscopic hematuria and bladder irritation persisted for over a month. Hyperbaric oxygen (HBO) therapy at 2.1 atmospheres for 90 min per day was

started on day 64 after CBT. Macroscopic hematuria resolved within a week, and microscopic hematuria was no longer detectable within 2 weeks. Hematuria did not recur after 11 sessions of HBO therapy, and no significant side effects were observed during or after treatment. HBO therapy could thus be useful in controlling refractory BKV-HC after CBT.

Keywords: BK virus; BK virus-associated hemorrhagic cystitis; cord blood transplantation; hyperbaric oxygen therapy.

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Clinical effectiveness of early treatment with hyperbaric oxygen therapy for severe late-onset hemorrhagic cystitis after hematopoietic stem cell transplantation in pediatric patients

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Abstract

HC is a possible cause of morbidity and extended hospitalization after HSCT. Recent studies have reported the efficiency of HOT in adult patients who underwent allogeneic HSCT, but data in children are scarce. We report our single center experience with HOT in late-onset HC after HSCT. Treatment with HOT consisted of daily sessions of breathing 100% O(2) for a total of 75 min in the hyperbaric chamber with a minimum of eight sessions. HOT had been associated with a concomitant treatment with oral oxybutynin, hyperhydration and/or irrigation of the bladder through the catheter. Cidofovir had been administered based on the demonstration of viral infection. Between 2004 and 2011, 10 patients developed severe HC after a median of 26 days after HSCT. HOT was started after a median of six days since the clinical diagnosis of HC. After a median of 10 sessions of HOT, seven of 10 patients were in complete remission. HOT is a well-tolerated procedure also in the pediatric setting. The early start of HOT might be effective in the treatment of HC offering advantages in terms of duration of symptoms and hospitalization.

ECIL guidelines for the prevention, diagnosis and treatment of BK polyomavirus-associated haemorrhagic cystitis in haematopoietic stem cell transplant recipients

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Abstract

Objectives: To define guidelines for BK polyomavirus (BKPyV)-associated haemorrhagic cystitis (BKPyV-HC) after paediatric and adult HSCT.

Methods: Review of English literature and evidence-based recommendations by expert consensus.

Results: BKPyV-HC occurs in 8%-25% of paediatric and 7%-54% of adult recipients undergoing allogeneic HSCT. Diagnosis requires the triad of cystitis, macro-haematuria and high urine BKPyV loads >7 log10 copies/mL, and exclusion of other relevant aetiologies. BKPyV viraemia is frequent and may serve as a more specific semiquantitative follow-up marker. No randomized controlled trials are available to inform antiviral prophylaxis or treatment. However, hyper-hydration and/or bladder irrigation showed limited prophylactic value. Fluoroquinolones are not effective for prophylaxis or treatment, but rather increase antibiotic resistance. Hyperbaric oxygen or fibrin glue is marginally effective based on small case series from correspondingly equipped centres. Although cidofovir has been reported to improve and/or reduce BKPyV viraemia or viruria, the current data do not support its regular use.

Conclusions: BKPyV-HC remains a disabling unmet clinical need in HSCT that requires novel approaches supported by proper clinical trials.