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SCIENTIFIC ARTICLE

Inhalational anesthesia maintenance with the Janus facial mask for transcatheter aortic-valve replacement: a case series

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KEYWORDS
Transcatheter aortic valve replacement;
Aortic stenosis;
Transesophageal echocardiogram;
Noninvasive ventilation;
Tracheal intubation;
Volatile anesthetics

Abstract
Background and objectives: Aortic stenosis is the most common type of heart valve disease. Percutaneous aortic valve replacement has become the alternative for patients considered at high risk for surgery. Controlled mechanical ventilation with tracheal intubation has been the choice for this type of procedure, however the use of noninvasive ventilation in cardiac patients has shown to be beneficial. Janus is a novel full-face mask that allows application for noninvasive ventilation support during anesthesia. Our main objective was to evaluate the feasibility of transcatheter aortic valve replacement with prolonged transesophageal echocardiographic monitoring under deep inhalational sedation delivered through a new mask for noninvasive ventilation.
Methods: A case series observational study that included five patients with critical aortic stenosis that underwent inhalational anesthesia with sevoflurane for transcatheter aortic valve replacement in a hybrid room of a teaching hospital. Standard monitors and bispectral index were used, followed by inhalational induction and placement of the Janus mask. Anesthesia was maintained with sevoflurane. Patients were transferred to intensive care unit after the procedure. Complications related to the mask use, transesofageal echocardiography accessibility and respiratory implications to the patients were recorded.
Results: All procedures were uneventful and no major complications were observed intraoperatively. One patient presented CO_2 retention (50 mmHg) and sevoflurane leak around the central opening of the mask, both without clinical significance.

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Conclusions: The use of inhalational anesthesia with the facial mask Janus is a safe and efficient alternative to general anesthesia with tracheal intubation for transcatheter aortic valve replacement and can easily accommodate the use of transesophageal echocardiography intraoperatively.

PALAVRAS-CHAVE
Substituição de válvula aórtica transcateter;
Estenose aórtica;
Ecocardiograma transesofágico;
Ventilação não invasiva;
Intubação traqueal;
Anestésicos voláteis

Manutenção da anestesia inalatória com a máscara facial Janus para substituição de válvula aórtica transcateter: uma série de casos

Resumo
Justificativa e objetivos: A estenose aórtica é o tipo mais comum de doença valvular cardíaca. A substituição percutânea de válvula aórtica tornou-se a alternativa para pacientes cirúrgicos considerados de alto risco. A ventilação mecânica controlada com intubação traqueal tem sido a escolha para este tipo de procedimento; porém, o uso de ventilação não invasiva em pacientes cardíacos mostrou ser benéfico. Janus é uma nova máscara facial que permite a aplicação de suporte à VNI durante a anestesia. Nosso objetivo primário foi avaliar a viabilidade da substituição transcateter de valva aórtica (TARV) com monitorização ecocardiográfica transesofágica prolongada sob sedação inalatória profunda através de uma nova máscara para ventilação não invasiva.
Métodos: Estudo observacional de série de casos que incluiu cinco pacientes com estenose aórtica em fase crítica, submetidos à anestesia inalatória com sevoflurano para TAVR em uma sala híbrida de um hospital universitário. Monitores padrão e índice bispectral foram utilizados, seguidos de indução inalatória e colocação da máscara Janus. A anestesia foi mantida com sevoflurano. Os pacientes foram transferidos para a unidade de terapia intensiva após o procedimento. As complicações relacionadas ao uso da máscara, a acessibilidade da ecocardiografia transesofágica e as implicações respiratórias para os pacientes foram registradas.
Resultados: Todos os procedimentos transcorreram sem incidentes e não foram observadas complicações maiores no intraoperatório. Um paciente apresentou retenção de CO_2 (50 mmHg) e vazamento de sevoflurano em torno da abertura central da máscara, ambos sem significância clínica.
Conclusões: O uso de anestesia inalatória com a máscara facial Janus é uma alternativa segura e eficiente à anestesia geral com intubação traqueal para TAVR e pode facilmente acomodar o uso de ecocardiografia transesofágica no intraoperatório.

Introduction

Aortic Stenosis (AS) is the most common valvular heart disease, occurring in up to 10% of all adults over 80 years old with a mortality rate of about 50% within 2 years.[1] The surgical aortic valve replacement still remains the standard approach for patients with low to intermediate surgical risk. Transcatheter Aortic Valve Replacement (TAVR) is the alternative for high-risk patients.[2,3]

Currently, TAVR is mainly performed under general anesthesia with tracheal intubation and mechanical ventilation. This technique is justified by the uncertainty linked to a new procedure, to the operator's learning curve, the possible complications and hemodynamic challenges, the necessity of a temporary cardiac immobility during the procedure, and the necessity for intraoperative Transesophageal Echocardiographic (TEE) imaging.[4]

Postoperative pulmonary complications in the elderly population are common after general anesthesia and they are associated with a prolonged hospital stay and an increased mortality rate.[5] Furthermore, avoiding general anesthesia in TAVR has been proved to reduce the overall procedure time and costs and to facilitate patients' mobilization and thus discharge.[6] Noninvasive Ventilation (NIV) has been evaluated in post-cardiac-surgery patients to prevent or treat postoperative acute respiratory failure. It has been increasingly used both in and outside the ICU setting, because it seems to be beneficial for respiratory and cardiovascular function, mainly in the elderly.[7] The Janus mask (Biomedical, Florence, Italy) is a full face mask that provides NIV and is also used for oxygen supplementation during sedation without tracheal intubation with an airtight port that allows TEE examination.

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