

# Difficult Airway Management in an Ankylosing Spondylitis Patient

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**Abstract:** *Patients with severe ankylosing spondylitis (AS) are frequently difficult or impossible to intubate because of limited mouth opening and/or head extension. Case: A 40 year old man, ASA III status, with AS, that was planned to receive anesthesia for an elective posterior segmental instrumentation was considered as a difficult airway management. In the operating theatre, after taking all precautions, the position for "Glidescope" use (GS) was given like the patient's feet, knees, shoulders and head were supported on pillows and then the table was adjusted to a moderate head-down position to give neutral position as far as possible within his comfort range and general anesthesia was induced. The laryngeal view was considered as Grade I (Cormack Lehane) with direct laryngoscopy. The intubation process succeeded smoothly at the first attempt. The operation was ended without any complication. Discussion: Although awake fiberoptic intubation is the best choice, the other options such as laryngeal mask airway, GS or direct laryngoscopy may be used for AS patients for airway management especially when they refuse to be intubated awake. These options are chosen according to the patient's and clinician's preferences, type of the procedure and the clinician's experience. Result: As a conclusion our case highlights that, direct laryngoscopy in the GS position might be a good, practical and useful option for AS patients.*

**Keywords:** ankylosing spondylitis, difficult airway

## 1. Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory disease of the joints, the main characteristic of which is the fusion of the bones in the spine, causing loss of flexibility of the back and neck. It is three times more common in males than females (1).

AS patients present specific challenges to the anesthetist. Both airway management and neuraxial access may prove to be difficult. The trend has been to deal with the airway challenge and avoid neuraxial anesthesia (2).

Patients with severe AS are frequently difficult or impossible to intubate because of limited mouth opening and/or cervical spine rigidity (3). The manifestations are limited mouth opening, limited cervical spine movement, atlantoaxial subluxation or fracture. The rigid spine makes positioning very difficult adding difficulty to the airway process (1)

Awake fiberoptic intubation is a more recent technique, which although technically demanding and is considered to be the safest and most effective method in known or suspected cases of difficult airway under direct vision (4) However some patients refuse this technique.

A case of difficult airway management in an AS patient is reported here.

## 2. Case Report

A 40 year old man, weighing 52 kg, height 170 cm, ASA III status, with AS for almost 20 years was planned to receive anesthesia for an elective posterior segmental instrumentation at Uludag University Medical Faculty Hospital.

In the preoperative assessment his history revealed that he had been operated on twice under regional anesthesia for right and left total hip replacement and once under general

anesthesia for posterior segmental instrumentation with intubation assisted by awake fiberoptic bronchoscope without any complications. Physical examination determined thoracic expansion was constricted, his cervical spine was slightly anteriorly flexed and immobile, his knees had limited extension, he had thoracic kyphosis and he could not stay in a supine position. The cardiovascular system assessment results were normal. Preoperative airway assessments showed limited neck extension so the range of motion of the head and neck was low. It was estimated that thyromental distance was  $\geq 6$ cm and interincisor distance was  $\geq 4$ cm. With these preoperative airway assessments he was categorised as a difficult tracheal intubation patient because of his immobile flexed neck, thoracic kyphosis and inability to stay in a supine position.

After preparing all the required equipment for difficult airway and intubation in the operating theatre, heart rate, non-invasive blood pressure and peripheral oxygen saturation were monitored. Although the airway management of these patients is generally recommended as awake fiberoptic intubation this time because the patient refused to be intubated awake it was decided to give the position to this patient for "Glidescope" use (GS) (figure I-II). For this position, the patient's feet, knees, shoulders and head were supported on pillows and then the table was adjusted to a moderate head-down position to give neutral position as far as possible within his comfort range. This procedure would increase the degree between the oral axis and horizontal level and make the following approach of the blade into the patient's mouth easier. As the main limitation of the GS compared to standard laryngoscopes is the resistance of advancement of the tracheal tube, it was decided to first try a standard laryngoscope in this case (5).

After his manual and spontaneous mask ventilation had been adequately confirmed and efficient preoxygenation was achieved, general anesthesia was induced with 1 mg midazolam, 160 mg propofol, 50 mg rocuronium bromide and 100 mcg fentanyl. After all the conditions had been provided for intubation, a Macintosh laryngoscope with a

size 3 blade was used for initial direct laryngoscopy. The laryngeal view was Grade I (Cormack Lehane) and the glottic opening could be viewed. As the intubation process succeeded smoothly at the first attempt with endotracheal tube I.D. 7.5 mm, the usage of the GS was not required for this patient. Anesthesia was maintained with remifentanyl and midazolam infusions. He was ventilated with 50% O<sub>2</sub>+50% N<sub>2</sub>O mixture. After the induction of anesthesia invasive arterial and peripheral central venous lines were inserted. The duration of the procedure was 9 hours. During and after the operation all parameters were stable and the patient could be extubated without any difficulty or complication at the end of the operation.

## Discussion

AS affects 0.40% of men and 0.05% of women (6) with a maximum incidence between 25-40 years of age. A strong genetic influence exists and is evident by the HLA B-272 factor, which is positive in 96% of cases. The clinical spectrum of the disease is wide with the skeletal system being extensively affected. Involvement of the costochondral and costocervical joints results in limited chest expansion and impaired movement of the ribs (7). The temporomandibular, cricoarytenoid and sacroiliac joints are also involved. The cervical spine may be significantly involved at varying degrees from mild limitation to total ankylosis. This is of great concern to the anesthetist. The degree of difficulty of intubation may not be evident on a Mallampatti score (8). The preoperative assessments include Mallampati classification, thyromental distance, interincisor gap and atlanto-occipital extension. In our case all airway assessments could be performed except Mallampati score because of his position.

Cardiac evaluation (electrocardiogram and echocardiogram) is essential to determine the cardiovascular risk. Involvement of the heart valves, especially the aortic valve, may be present, with associated conduction defects. The sudden and intense variation in systemic vascular resistance caused by spinal anesthesia is not tolerated by patients with defects in the aortic valve. External cardiac massage in the presence of a rigid thoracic wall may be ineffective (9). Fortunately our case did not have any cardiac disease.

Airway management and intubation in AS patients can be challenging. Ankylosing produces a rigid 'bamboo spine' that restricts neck movement and thus DL and tracheal intubation become difficult or impossible. Cervical spine involvement in ankylosing spondylitis is of great concern for the anesthetist. Cervical spine mobility is decreased and in severe cases total rigidity occurs in a flexed position. The degree of spine involvement will determine how difficult the tracheal intubation could be. Special care should be taken to avoid excessive manipulation of the neck, which could cause trauma to the spinal cord. Awake fiberoptic intubation is the safest choice at present, but some patients can not tolerate the procedure and may refuse awake intubation. There are several alternatives that can be used for these patients, such as laryngeal mask airway or lightwand intubation (10). Laryngeal mask airway devices have been used successfully in AS patients after inhalational anaesthesia induction and are considered to be

an alternative for airway management (3). In our case the type of the operation was not suitable for LMA device.

AS leads to fibrosis, ossification, and ankylosis along the spinal column and sacroiliac articulations. Cervical column and atlanto-occipital articulation mobility are reduced and in severe cases the cervical vertebrae become fixed in a flexed position. Patients with this condition may also have temporomandibular joint involvement, further complicating airway management. Patients with AS are also prone to spinal fractures even from minor movements and especially the extension position given for the airway management may result in neurological deficit and death. Careful manipulation of the neck during tracheal intubation is mandatory(10). The case presented here was intubated very carefully to avoid such fractures.

In our case although the position of the patient was for Glidescope use, the Glidescope was not used because we were able to intubate the patient at the first attempt with the Macintosh blade. While B.Gunaydin et al failed to perform to intubate an AS patient with the Glidescope, Lai et al successfully performed nasotracheal intubation using the Glidescope (10).

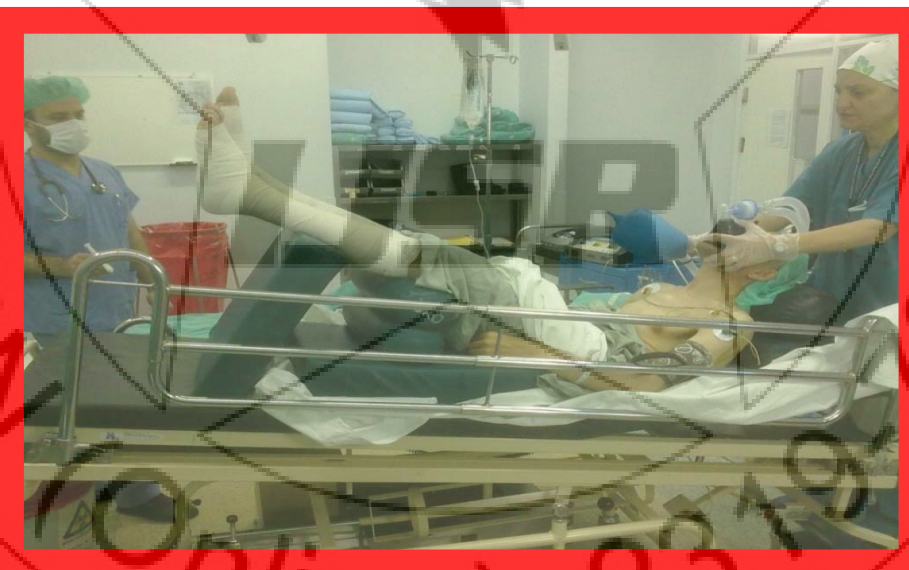
Although awake fiberoptic intubation is the best choice, the other options such as LMA, GS or direct laryngoscopy may be used for AS patients for airway management especially when they refuse to be intubated awake. These options are chosen according to the patient's and clinician's preferences, type of the procedure and the clinician's experience(10). Although recent studies have demonstrated that nasal tracheal intubation with the GlideScope in patients with suspected difficult airways, such as in AS cases, is rapid and successful, as a conclusion our case highlights that after securing mask ventilation and preparing all other devices for difficult airway management, direct laryngoscopy in the GS position might be a good, practical, useful and safe option for AS patients.

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Figure I-II: GS use position was given to the patient.



Figures 1-2