



## Original research

# Do the complications increased in the anterolateral right-side approach to treat the cervical degenerative disorders? A retrospective cohort study



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## HIGHLIGHTS

- Right-side approach of anterior cervical surgery is controversial comparing to left-side approach.
- Right-side anterior cervical approach is a safe procedure.
- Right-side anterior approach doesn't increase the incidence of dysphagia and recurrent laryngeal nerve palsy.

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## ABSTRACT

The dysphagia and recurrent laryngeal nerve (RLN) palsy are the most common complications of the patients who underwent anterior cervical surgery in the current literature. These morbidities have led to the study of the impact of sidedness in anterior cervical spine surgery. However, many reports documented the left-side was more effective and safe than right-side based on the anatomy. So the right-side approach is more challenging. We retrospectively study 503 patients with cervical degenerative diseases who underwent cervical spinal surgery using anterolateral right-side approach in our spine center from September 1999 to December 2012 and evaluate the efficient and safety of the anterolateral right-side approach to treat the cervical degenerative diseases. The overall mortality rate in our present report was 3.38% (17 of 503 patients). The most common complication which observed in 2.80% of our cases was dysphagia. Postoperatively, there was only one patient with hematoma and died (0.19%) and symptomatic recurrent laryngeal nerve palsy occurred in 0.39% of the cases. The anterolateral right-side anterior approach didn't increase the incidence of the dysphagia and recurrent laryngeal nerve (RLN) palsy.

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## 1. Introduction

The anterior cervical discectomy and fusion (ACDF) which was firstly introduced by Smith GW, Robinson RA<sup>1</sup> and Cloward RB<sup>2</sup> in the 1950s. It has been considered a good procedure for treating disc disorders of cervical spine. The choice of the left-or right-side is still a controversy. The standard anterior procedure was left-side approach, which was depicted by Smith GW [1]. However, the high rate complications of the left-side approach have been documented in literature, including jugular vein, carotid artery,

vertebral artery, pharynx, cervical sympathetic chain, laryngeal nerves and esophagus. This morbidity has fueled discussion as to which side is the best approach to treat cervical degenerative diseases. Accordingly, Ghanayem [3] noted, “the question as to whether the right RLN is at greater injury than the left remains unanswered.” We retrospectively study 503 patients who underwent anterior cervical surgery with the anterolateral right-side approach.

## 2. Materials and methods

### 2.1. Patients

A total of 503 patients with cervical diseases who underwent cervical spinal surgery using anterolateral right-side approach

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were performed by the same surgeon from September 1999 to December 2012. This study involved 513 patients with a mean age of 52.9 years (ranged 36–78 years). Ten patients lost follow-up. The clinical symptoms included Headaches, dizziness, neck stiffness/pain, upper limbs pain/numbness/radicular pain/weakness and lower limbs weakness because of cervical nerve root or spinal cord compression, cervical spine tumors or disc degeneration (Table 1). The diagnosis was made by MRI or CT scan and historical pathology.

## 2.2. Surgical approach

The patient was positioned supine for anterolateral right-side approach to the cervical spine during the operation. The heads of the patients were positioned slightly extension, but without excessive traction. All the patients, including one, two, three and four surgical-levels, corpectomy and alone cage (Figs. 2 and 3 & Table 2) were performed with a 2.5–3.0 cm transverse skin incision following the transverse neck dermatoglyphics (Fig. 1). Following the incision, the platysma was divided and the sternocleidomastoid muscle and the superficial cervical fascia could be easily observed in the plane deep to platysma. The neurovascular bundle could be explored after retraction of the sternocleidomastoid muscle, which consists of the vagus nerve, the common carotid artery and the internal jugular vein. Blunt finger dissection could identify the plane of tissue separation between the neurovascular bundle laterally and the thyroid gland. When the blunt dissection has been completed, the deep cervical fascia and the anterior longitudinal ligament and vertebral bodies are exposure. The whole progress mean took 10 min (range 5–15 min).

## 2.3. Statistical analysis

Statistical analyses were performed using the SPSS17.0 software package. The relationship between the number of operative segments and the incidence of complication was assessed using the Chi-square test and *student t*-test. A P-value of less than 0.05 was considered statistically significant.

## 3. Results

All the patients were followed up at least 1-year. The overall mortality rate was 3.38% (17 of 503 patients) in our study including RLN palsy, dysphagia and hematoma (Table 3). Actually, the most common complication was dysphagia after operation 3 months follow-up as reports documented in the literature (Table 4), which observed in 2.80% of our cases. Fortunately, the uncomfortable symptoms of the 14 cases totally disappeared at one-year follow-up and they got the satisfactory outcome at final follow-up. The number of surgical levels was not related to the risk of dysphagia ( $P > 0.05$ ).

**Table 1**  
Summary of Patient demographics and clinical symptoms.

Demographic feature	No. Patients (%)
<b>Age</b>	54.8years(range, 36–78yrs)
<b>Weight</b>	68.9 Kg(range, 46.3–81.5 Kg)
<b>Sex</b>	
Male	218
Female	285
<b>Patients symptoms<sup>a</sup></b>	
Headaches/dizziness	124
Neck stiffness/pain	367
Upper limbs pain/numbness/radicular pain/weakness	245
Lower limbs weakness	478

<sup>a</sup> There were many patients have several clinical symptoms.

**Table 2**  
Summary of surgical levels in 503 patients.

Surgical level	No. Patients (%)
<b>Discectomy</b>	
One-level	47
Two-level	136
Three-level	102
Four-level	54
<b>Corpectomy</b>	
One-level	67
Two-level	45
Three-level	19
Alone cage or artificial disc	33



**Fig. 1.** A 56-year old man who underwent the anterolateral right-side approach with a transverse 2.5 cm skin incision following the transverse neck dermatoglyphics was only 6 months after operation.

Symptomatic RLN palsy occurred in 0.39% of this report immediately after operation. The number of surgical levels was not related to the risk of RLN palsy ( $P > 0.05$ ). Two patients completely restored at 6 months follow-up. Unfortunately, there was one patient with hematoma and died after operation.

## 5. Discussion

The anterior cervical discectomy and fusion (ACDF) has been the

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