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LUSTA Large Channel Endoscopy in the Treatment of Severe Lumbar Spinal Stenosis Complicated with Aneurysm of Ascendingaorta: A Case Report

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Abstract: *Aneurysm of ascendingaorta is a clinical disease with low incidence but high risk, which can lead to death in severe cases. Patients are often accompanied by hypertension and systemic atherosclerosis, and 20% of the patients have a family history [1]. For patients with large tumor diameter, rapid tumor growth or related clinical symptoms, clinical treatment should be done as early as possible. Lumbar spinal canal stenosis (lumbar spinal stenosis, LSS) is common in elderly patients. For LSS patients with aneurysm of ascendingaorta, surgical indications should be strictly controlled during surgical treatment to avoid adverse accidents. When choosing surgical procedures, less operational trauma and shorter operation time should be take into consideration to reduce the rate of complication. Lumbar large channel endoscopic system (SPINENDOS LUSTA system, LUSTA) is a modified large channel spinal endoscopic system, which has the advantages of less trauma, high decompression efficiency and short operation time. A case of lumbar spinal stenosis complicated with aneurysm of ascendingaorta treated with LUSTA system is reported.*

Keywords: *LUSTA, large channel endoscopy, lumbar spinal stenosis, aneurysm of ascendingaorta*

1. Clinical data

1.1. General data

The patient Yang, a 72-year-old male, was admitted to hospital because of "low back pain with numbness in the left lower limb for more than 10 years, aggravated for 20 days". More than 10 years before admission, the patient reported that there was no obvious inducement for lumbar pain and pain with numbness and discomfort of the left lower limb, obvious aggravation of symptoms after standing and sitting up, slight relief of symptoms after bed rest, and aggravation of the above symptoms 20 days before admission. Self-treatment in the local hospital (specific unknown), the curative effect was poor, so he went to our hospital and was admitted to the hospital with"LSS".Physical examination: L4-5, L5-S1 intervertebral space and left paraspinal tenderness, percussion tenderness (+). "straight leg raising test, left 20 ℃(+), strengthening test (+), waist and back extension test (+). The muscle strength of the extensor digitorum dorsalis muscle of the left foot was IV, the extensor muscle of the left ankle was IV, the muscle strength of the left quadriceps femoris was IV, and the muscle strength of iliopsoas muscle was IV. The sensation of the skin on the lateral, posterior and dorsal side of the first toe decreased, but there was no obvious abnormality in the Sellar area. Patellar clonus and ankle clonus were negative, and the pathological signs were not elicited. CT (figure 1) and MRI (figure 2): 1. Lumbar spinal canal stenosis (L4-5, L5-S1); 2. Ossification of ligamentum flavum of thoracic vertebrae (T11-12); echocardiographic findings (figure 3): left ventricular enlargement, aneurysm of ascendingaorta with aortic valve insufficiency, aortic valve calcification, aortic sinus widening, EF46%, cardiac dysfunction. Dynamic electrocardiogram (figure 4): atrial extrasystole, atrial premature dichotomy, ST-T changes and ventricular extrasystole. Arterial blood gas analysis suggested that PO2 57mmHg, PCO2 28mmHg.

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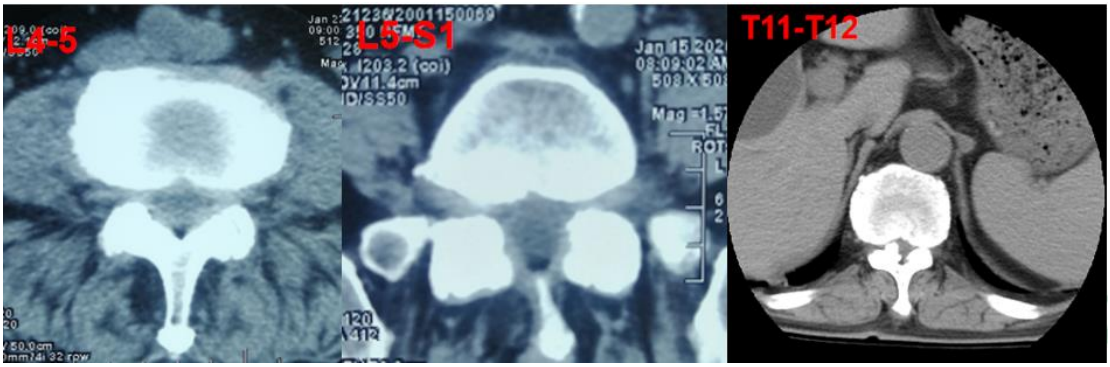

Figure 1: Preoperative CT

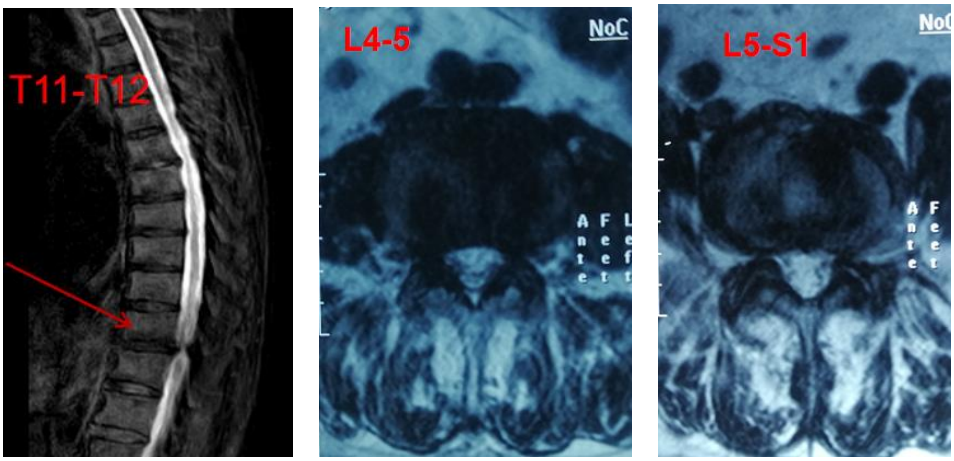

Figure 2: Preoperative MRI

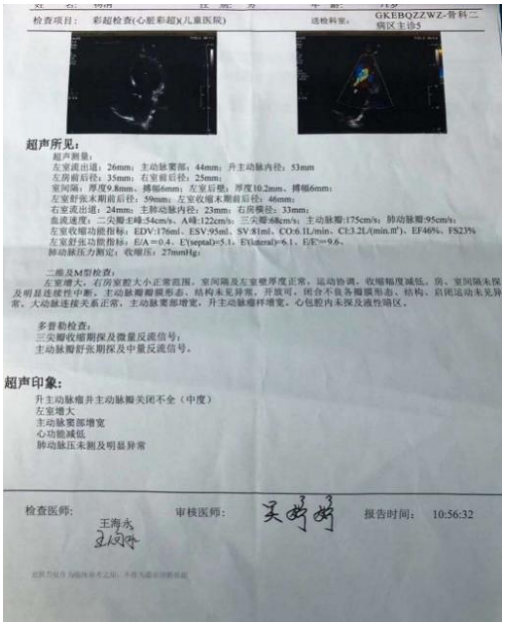

Figure 3: Echocardiographic

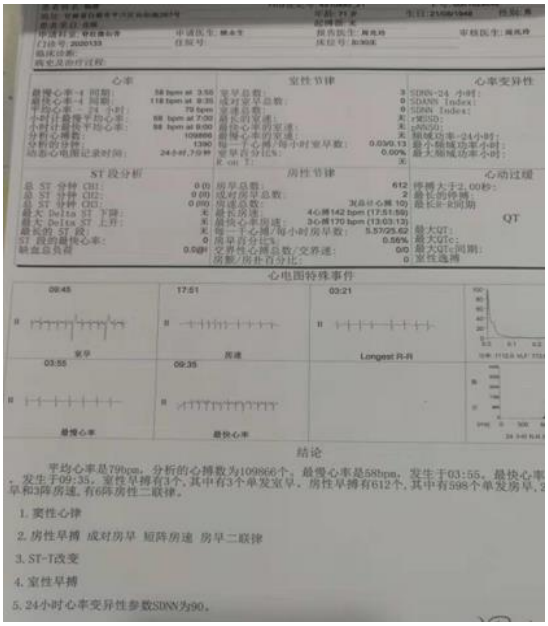

Figure 4: Dynamic electrocardiogram

1.2. Diagnosis

(1) Lumbar spinal stenosis (L4-5, L5-S1);

(2) Ossification of thoracic ligamentum flavum (T11-12);

(3) Coronary heart disease;

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(4) Aneurysm of ascendingaorta;

(5) Thrombocytopenia

1.3. Treatment plan

Under general anesthesia, bilateral decompression was performed by LUSTA large channel endoscopic trans laminar unilateral approach.

1.4. Operation process

The cardiac function and blood volume were evaluated by TTE before operation, which accorded with the operation conditions. After successful general anesthesia, the patient lies prone on the operating bed.The interlaminar spaces of L4-5 and L5-S1 were located under C-arm fluoroscopy, and 0.5-1cm was used as the puncture point near the spinous process on the left, and the body surface was marked.With the body surface marked as the puncture point, the soft tissue expansion tube was placed into the L4-5 interlaminar direction through the incision. After confirming the target position of the tip of the expansion tube by fluoroscopy, the working channel was established through the soft tissue expansion tube. Re-perspective to confirm the location of the working channel.Through the working channel, the endoscope was placed into the large channel, washed with normal saline, and the working channel was rotated under the endoscope. The interlaminar space was explored through the medial edge of the inferior facet joint of the responsible vertebral body, the soft tissue around the interlaminar space was cleared and the bony structure was exposed. A grinding drill was used to grind the hypertrophic bone of the upper and lower lamina, enlarge the lamina window and expose the space between the ligamentum flavum and the lamina. Then, the hyperplastic bone of the upper and lower lamina and the cohesive hyperplastic bone of the articular process were removed with rongeur, and the ligamentum flavum was separated under the exploration of nerve hook to expose the compressed nerve root. Under endoscopic monitoring, the hypertrophic ligamentum flavum was removed, the dural sac was exposed and the nerve root was released to complete decompression. Cross the working channel over the dural sac, then tilt the channel to decompress to the opposite side. Under the microscope, high-speed grinding drill and black gold rongeur were used to remove the contralateral hyperplastic bone and ligamentum flavum, expose the nerve root, and complete the release of the contralateral dural sac and nerve root.The L5-S1 segment was decompressed in the same way. Under the microscope, the bilateral nerve roots and spinal canal were decompressed completely, there was no obvious active bleeding, and the endoscope was withdrawn. The incision was sutured and bandaged subcutaneously, and the operation took 1.5 hours. Close attention was paid to the vital signs of the patients during the operation, and the operation went smoothly.

2. Discussion

As elderly patients are prone to hypertension, coronary heart disease and other medical diseases, the incidence of aneurysm of ascendingaorta increases. Moreover, for patients with osteoporosis, due to the increase of age and the attachment of calcium ions in bones to the arterial wall, the vascular wall gradually hardens and calcifies [2], and the loss of calcium ions can accelerate the development of osteoporosis, further reduce the elasticity of the ascending aorta and increase the risk of arteriosclerosis [3]. In addition, this patient is accompanied by cardiovascular disease because of severe low back and leg pain, but most doctors miss the diagnosis of aneurysm of ascendingaorta because of medical inertia, so patients must be examined comprehensively to avoid serious accidents during the operation [4]. During the operation, attention should be paid on the control of the blood pressure and heart rate of the patients, fully relieve pain and sedation, to reduce the fear of the patients, and avoid the increase of blood pressure and the rupture of the dissection caused by mood fluctuations. If dexmedetomidine is used to stabilize the blood pressure and heart rate of patients, so as to play a good sedative and analgesic effect [5], it has a certain application value for LSS patients with aneurysm of ascendingaorta.

At present, open decompression and fusion are still the main means for the treatment of LSS, but the unstable blood pressure, large wound, long time and large blood loss during open operation can increase the incidence of postoperative complications [6]. Due to the particularity of the disease and the complexity of surgery, most LSS patients are often advised to take conservative treatment, but long-term pain seriously affects the quality of life of patients, and is not conducive to the control of aneurysm of ascendingaorta and hypertension. With the development of minimally invasive technology, spinal endoscopy has achieved good clinical results in LSS [7-9]. Especially for the elderly and high-risk LSS

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patients, spinal endoscopic therapy has unparalleled advantages [10-11]. The LUSTA system used in this patient has the advantages of small incision, high decompression efficiency, less tissue injury in low back and short hospital stay. During the operation, the vital signs of the patients were stable, the compressed nerve roots were decompressed thoroughly, and no adverse conditions occurred. They were discharged from hospital 3 days after operation. The patients were followed up for 1 year and recovered well, and the treatment effect was satisfactory.

Through this case, the author's team believes that: (1) Patients should be comprehensively examined during diagnosis and treatment to avoid missed diagnosis: due to the refinement of various specialties, doctors are easy to be misled by habitual thinking and lack of comprehensive diagnostic thinking in the process of diagnosis and treatment. Therefore, patients should be examined comprehensively and carefully in the process of diagnosis and treatment to avoid missed diagnosis or even misdiagnosis. (2) Have the courage to face the challenge. Always put the interests of patients first. Due to the complexity of the patient's condition, the patient was told that he could not be operated in many hospitals. In line with the concept of patient first, the author team actively invited various doctors to consult, and finally worked out the operation plan of spinal canal decompression through interlaminar approach for LUSTA system. (3) Actively explore the indications of percutaneous spinal endoscopy. Percutaneous spinal endoscopy has the advantages of small trauma, accurate and efficient decompression and short hospital stay, which is extremely suitable for elderly patients who cannot tolerate traditional open surgery. This patient is old, complicated internal diseases, severe stenosis and double-segmental stenosis, so it is not suitable to use conventional endoscopic system. LUSTA system has the characteristics of large working channel and strong power, so we boldly applied it to the treatment of patients and we have achieved good results.

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