through osseous pathways.[16] In this study, 3 patients relapsed within 1 year after the surgery. This may have been associated with nerve regeneration through the autologous bone fragments or because the buccal nerve had not been cut off. Generally, pain recurrence related to the lingual nerve is rare; however, pain recurrence is common in the buccal nerve because the nerve branches are small and rich, and the anatomical signs are not obvious. Therefore, in future clinical operations, to reduce the recurrence of pain, the inferior alveolar nerve and the buccal nerve can be avulsed at the same time; however, due to the extra trauma involved, the physical condition and requirements of the patients should be considered.[17]

In conclusion, modified backward avulsion is the recommended therapy for third-branch primary trigeminal neuralgia owing to its reduced trauma, efficacy, and acceptance by patients who want a higher quality of life. However, it should be remembered that nerve avulsion is a destructive treatment and that patients may experience symptoms such as numbness and loss of taste. The best treatment should be chosen according to the patient, and this method cannot be ignored in future medical practice.

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OPEN

Application of YL-1 Needle in Chronic Subdural Hematoma Treatment for Super-Aged Patients

Xifeng Fei, MD, Yi Wan, MD, Zhimin Wang, MD, Hanchun Chen, MD, and Dongyi Jiang, MD

Objective: The proportion of the super-aged population (at the age of 80 or above) in patients with chronic subdural hematoma (CSDH) and the incidence of CSDH of the population have been increasing. Since it is widely accepted that YL-1 needle is effective in CSDH treatment, this paper aimed to probe into the efficacy of YL-1 needle in minimally invasive surgery for super-aged (at the age of 80–90) CSDH patients.

Methods: A retrospective analysis on the clinical information of 17 super-aged CSDH patients having received the YL-1 needle puncture treatment provided by the hospital from May 2012 to December 2016 was performed. At the same time, another 19 CSDH patients (ages 60–79) who were hospitalized during the same period were randomly selected to form a control group. The same surgical treatment was provided for both groups to observe and compare the treatment efficacy.

Results: The patients of both groups were cured and discharged. Among the super-aged patients, there was 1 patient with postoperative hematoma recurrence, 1 patient with pneumocephalus, and 1 patient with wound infection; among the aged patients,

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1 reported postoperative recurrence and 2 had pneumocephalus; The average length of stay of the super-aged group was 9.235 ± 2.948 days while that of the aged group was 7.316 ± 3.660 days, which showed no statistical difference.
Conclusion: The YL-1 needle puncture treatment is safe and efficacious for both the super-aged and the aged CSDH patients.

Key Words: Aged and super-aged patients, CSDH, surgical treatment, YL-1 needle

Chronic subdural hematoma (CSDH), first introduced by Wepfer in 1656, refers to the space-occupying lesion caused by slow hemorrhage between the dura of the brain and its arachnoid and a collection of blood in the cerebral subdural space. In most patients, clinical symptoms occur after presence of the lesion for over 3 weeks.[1,2] Chronic subdural hematoma is a common disease in neurologic practice. It is more common in middle-aged and older patients. Before the computed tomography (CT) and magnetic resonance imaging (MRI) technology was invented, erroneous diagnosis and treatment happened frequently. Presently, the CT and MRI technology enables correct diagnosis on the disease, and yet, surgical treatment has been the main solution for decades because most of the patients have progressive hematomas. In recent years, although it has been reported that atorvastatin can partially cure CSDH,[3] surgical treatment remains as the only option for those who have failed to recover with medication. With China's aging population growing, the traditional definition of the aged population (at the age of 60–79) has become outdated because the average life span of the population in developed regions has reached over 80 years, which indicates the emergence of the super-aged population (at the age of 80 or above). In general, the number of patients in demand for CSDH diagnosis keeps increasing as the aging population rises. In terms of surgical treatment, since older patients have more underlying diseases, they have to face a greater surgical risk or even death.[4] In fact, except for the age of a patient, the level of surgical risk is also associated with the degree of surgical invasion. In this paper, a report on the CSDH patients who had been cured with the YL-1 needle was provided, in which, it was held that the YL-1 needle was safe in the treatment for the super-aged CSDH patients, and the aged ones, as well.

DATA AND METHODS

General Information

Thirty-six patients with CSDH treatment with the YL-1 needle from May 2012 to December 2016 were selected from the hospital and divided into 2 groups, including a super-aged group composed of 17 patients at 80 to 90 years old and an aged group having 19 patients at the age of 60 to 79. Both groups had male and female patients who were verified to meet the CSDH diagnostic standards through brain CT or MRI scanning. The selected patients mainly showed following clinical symptoms: headache, dizziness, nausea, vomiting, stumble, hemiplegia, and cognitive handicap. The brain CT results indicated that hematomas, in the thickness ≥1 cm and with the midline shift >0.5 cm, could appear on the left or the right or both sides of the brain (Table 1).

TABLE 1. Main Clinical Symptoms of Chronic Subdural Hematoma Patients

Symptom / Age	Headache	Dizziness	Nausea and Vomiting	Hemiplegia	Stumble
Aged group	13	8	6	6	5
Super-aged group	11	5	0	7	3

Operation Methods

The piercing point at the center of the thickest layer of the hematoma is marked with a clip or bone wax (applicable to MRI scanning only) during CT or MRI scanning without damaging the functional areas, venous sinus, middle meningeal artery, etc. The 2 cm YL-1 needle supplied by Beijing WanTeFu Medical Apparatus Co, Ltd is selected for surgical treatment. After routine disinfection, the patient is draped and local anesthesia with lidocaine is performed. Then, an incision is made to 0.5 cm in the patient's scalp with a sharp blade. The puncture needle is connected to an electric trepanning drill before piercing. When it arrives at the piercing point, the surgeon can obviously feel the puncture needle piercing the hematoma. The side drainage tube is connected in advance and clamped before the core needle is removed when there is soy sauce-like or dark-red fluid flowing or spurting out, which indicates successful puncture; then, an apical drainage tube is immediately added and clamped while the clamp of the side drainage tube is removed so that the fluid can slowly flow. When the pressure is reduced, physiologic saline in 20 mL each time flow slowly in the apical drainage tube repeatedly and the side drainage tube is open to discharge the bloody fluid until the effluent becomes clear. Finally, the patient is sent back to the ward with the drainage tube fixed and the cut dressed. In the following 2 to 3 days, the patient needs to drain continuously. In patient with bilateral CSDH, the same procedures should be performed on the other side of hematoma. After operation, the patient should maintain a prostrate position in the ward. Infusion can be carried out as appropriate to facilitate brain reposition. In 1 to 2 days after operation, another CT scanning should be conducted to check whether there is residual flocculate. Meanwhile, 30,000 to 50,000 IU urokinase injection can be given to accelerate dissolution of flocculate, achieve thorough drainage, and reduce the possibility of recurrence. In 2 to 4 days after operation, the puncture needle can be removed according to the drainage volume and reposition of brain tissue. The cut should be sewed up after removing the puncture needle and the stitches should be taken out after a week (Figs. 1-2).

Follow-Up Visits

The periods of follow-up visits varied from 10 months to 4 years, during which, patients had received at least 2 CT reexaminations.

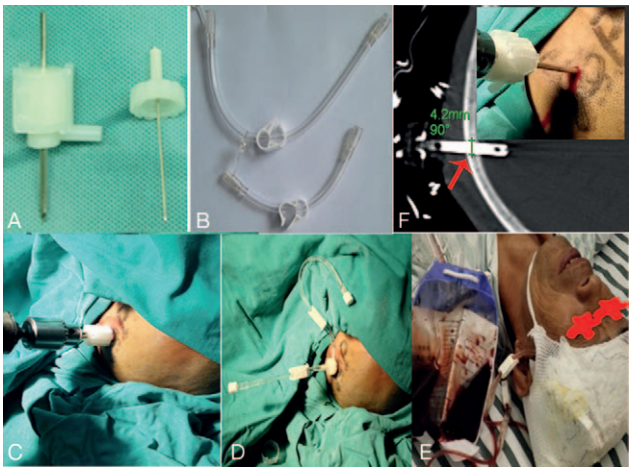

FIGURE 1. Sketch of YL-1 puncture needle. (A-B) Installation diagrams of YL-1 needle, mainly including a trepan, a 3-way needle and a blunt core needle in A and a side drainage tube and an apical drainage tube in B (see D); (C-E) Diagrams of intraoperative procedures and postoperative drainage; (F) P represents the piercing point with the cut of 0.5 cm in depth and the trepanned hole in the bone of 4.2 mm in diameter (red arrow).

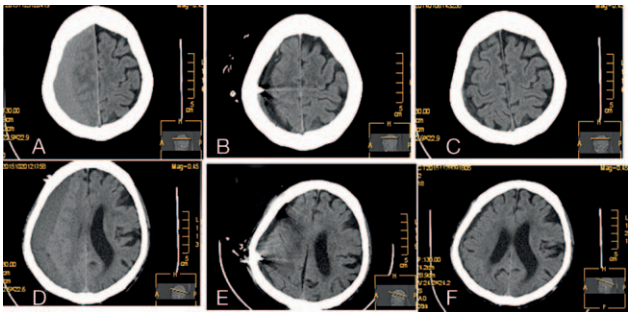

FIGURE 2. Drainage operation of YL-1 puncture needle in chronic subdural hematoma trepanation. (A-C) Computed tomography images of a 71-year-old female patient before operation, on day 1 after the operation, and after 3 months from the operation; (D-F) computed tomography images of an 86-year-old male patient before operation, on day 1 after the operation, and after 3 months from the operation.

Patients mainly paid follow-up visits by receiving outpatient service. Follow-up visit via telephone was also available.

Efficacy Observation

Cure: The clinical symptoms and signs disappear and the imageologic examination result demonstrates complete removal of hematomas. Recurrence: In 3 to 6 months after the primary operation, it is demonstrated through CT scanning that the CSDH and the corresponding symptoms and signs recur in the same position as the original hematomas. Complications: The complications mainly include pneumocephalus and wound infection.

Statistical Analysis

The SPSS18.0 software was used for data analysis. The measurement data were tested with the t test statistical method while the recurrence rates and complication incidence rates of both groups were analyzed with the Mann–Whitney U test of the rank-sum test. $P < 0.05$ indicates that the difference between the 2 groups has statistical significance.

RESULTS

General Information of Patients

Among the 36 patients, 26 had head injuries in the previous 1 to 2 months, equal to 72.2% of the total number of patients of both groups in this paper while another few patients reported bleeding of undetermined origin; the number of male patients in both groups outperformed that of female patients, probably because male patients were more likely to have injuries. Hematomas were divided into left, right, and bilateral hematomas in terms of the position of occurrence. Hematomas were extensively distributed in the frontal, parietal, and temporal lobes in the thickness $\geq$1 cm (see Table 2).

Comparison of Cure Rate, Recurrence Rate, Complication Incidence Rate, and Length of Stay Between Aged and Super-Aged Groups

Patients in both groups were cured and discharged. Among the super-aged patients, there was 1 patient with pneumocephalus and 1 patient with wound infection, representing a complication infection rate of 11.8% while another patient had postoperative recurrence, showing a recurrence rate of 5.9%; as to the aged group, 2 patients developed pneumocephalus, representing a recurrence rate of 10.5% while other patients had no other complications. Meanwhile,

TABLE 2. General Information of Patients

	Super-Aged Group	Aged Group
Number of patients	17	19
Male	11	15
Female	6	4
Hematoma position		
Left frontal, parietal, and temporal lobes	5	8
Right frontal, parietal, and temporal lobes	8	6
Bilateral frontal, parietal, and temporal lobes	3	5
Having a history of head injury	14	12

TABLE 3. Recurrence Rates of 2 Groups

Groups	n	Nonrecurrence (%)	Recurrence (%)	Z	P
Super-aged group	17	16 (94.1)	1 (5.9)	0.080	0.936
Aged group	19	18 (94.7)	1 (5.3)		

TABLE 4. Complication Incidence of 2 Groups

Groups	n	Noncomplication (%)	Complication (%)	Z	P
Super-aged group	17	15 (88.2)	2 (11.8)	0.116	0.907
Aged group	19	17 (89.5)	2 (10.5)		

in the aged group, there was 1 patient with recurrence, showing the recurrence rate of 5.3%. There is no significant difference in complication incidence and recurrence rates between the groups ($P > 0.05$, Tables 3-4). The length of stay of the super-aged group was 9.235 ± 2.948 days while that of the aged group was 7.316 ± 3.660 days. Although the former is slightly longer than the latter, it shows no statistical difference ($P = 0.0917$) (Fig. 3).

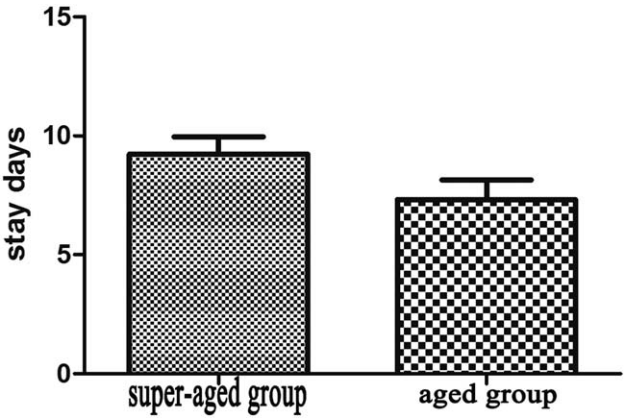

FIGURE 3. Length of stay. No statistical difference between the 2 groups ($P > 0.05$).

DISCUSSION

Pathophysiology of Chronic Subdural Hematoma

Chronic subdural hematoma is commonly seen in the middle-aged and older population and head injury is an important cause of CSDH. Other factors that may lead to CSDH include excessive drinking, epilepsy, cerebrospinal fluid, disturbances of blood coagulation, and so on.[5] Compared with the middle-aged population, with the same external factors, the aged has a relatively higher incidence of CSDH. In addition, there are few reports on CSDH in teenagers. Therefore, the age factor plays a considerably important role in the incidence of CSDH. Aging is not only associated with endocrine changes but also a direct factor leading to atrophy of brain. Hence, CSDH may called a physiologic atrophy-related senile disease. The pathophysiologic process of CSDH indicates that even a small amount of bleeding due to a light head injury can evolve into inflammatory reaction; in a few days, the fibroblasts invade the blood clots and form an envelope between the visceral layer and the parietal layer while the outer layer of the envelope, which is stimulated by the growth factors of vascular endothelial cells, forms a number of immature new vessels that break repeatedly; at the same time, fibrin breakdown products increase due to plasmin hyperfunction, resulting in loss of blood coagulation function and continuous growth of hematomas.[6,7] The characteristic change of CSDH refers to the repeated angiorrhexis of newly formed immature vessels induced by the growth factors of vascular endothelial cells, which creates a vicious circle and further leads to slow growth of hematoma. Therefore, to address both the symptoms and root causes, the space-occupying hematomas should be removed and more importantly, the basic materials of vascular endothelial cells (ie, coagulation fragments) should be eliminated.

Treatment of Chronic Subdural Hematoma

The development of CSDH is based on the above-mentioned pathophysiologic process. Hence, in the state of local anesthesia, hematomas can be removed through trepanation, rinsing, and postoperative drainage while the growth factors of vascular endothelial cells and anticoagulant factors in the hematomas can be eliminated at the same time so that the patient can be cured. At present, the traditional sphenotresia accompanied by drainage is still the major clinical treatment method for CSDH. Compared with bone flap craniotomy, it is considered to be a "minimally invasive keyhole operation." Yet, it is not comparable to the YL-1 puncture needle CSDH trepanation and drainage operation in terms of the degree of invasion. In addition, the traditional trepanation and drainage operation cannot avoid such postoperative complications as infection, brain injury, intracranial hemorrhage, leakage of cerebrospinal fluid, and epilepsy.[8] Further, in the previous reports, we[9] have pointed out that compared with the traditional sphenotresia and drainage, the YL-1 puncture needle CSDH trepanation and drainage operation has obvious advantage in reducing the postoperative complication incidence and recurrence rates. Meanwhile, the YL-1 puncture needle CSDH trepanation and drainage operation, similar to the traditional trepanation and drainage operation, is characterized in intraoperative rinsing and postoperative drainage; in addition, it is convenient and time-saving, with the averaged time of operation ranging from 15 to 30 minutes; besides, its exceptional performance in reducing the degree of invasion has effectively relieved patients' pain.[10] With the advantages above, the operation is suitable for the super-aged patients having various underlying diseases because they usually have poor cardiorespiratory function. The degree of invasion and the time of operation play an important role in determining whether they can come through the operation or not. The above-mentioned characteristics of the YL-1 puncture needle make the trepanation and drainage operation an effective solution to different indications, especially for the super-aged patients. Thanks to the application of YL-1 puncture needle to the operation, oral anticoagulant is no longer an absolute contraindication.

It should be specifically noted whether the application of YL-1 puncture needle to CSDH treatment can outperform neuroendoscopic treatment. Neuroendoscopic treatment is an emerging program that requires a greater number of patients and professional reports to gain its own advantages. Presently, it allows open diaphragm of multilocular hematomas under endoscope, which remains as its primary advantage.[11] However, multilocular CSDH has a low incidence rate. Moreover, the cranial hole in neuroendoscopic treatment is much larger than that in the treatment with the YL-1 puncture needle. In addition to the cranial hole, the former shows poorer performance in preoperative preparation, physician training, and time of operation compared with the latter.[12]

Reflection of Similar Efficacy of YL-1 Puncture Needle Treatment for Super-Aged and Aged Chronic Subdural Hematoma Patients

Postoperative recurrence is one of the main reasons for poor prognosis of CSDH patients. It is probably related to the age and hematoma volume of a patient.[13] In terms of the efficacy of the YL-1 puncture needle, senile atrophy of brain—an important factor in postoperative recurrence—must be taken into account because the atrophy of brain will reduce the intracranial pressure, retard the postoperative brain reexpansion, and cause difficulty in hematoma drainage. Therefore, the treatment for super-aged CSDH patients should meet the following requirements as possible: the time of operation should be short while the hematomas should be thoroughly rinsed because, as mentioned above, residual coagulation fragments can lead to postoperative hematoma recurrence; after operation, the intracranial pressure should be increased as appropriate because the super-aged patients usually have multiple underlying diseases that prevent brain reexpansion with the fluid replacement therapy; patients are required to maintain a prostrate position or the trendelenburg position after operation to speed up the brain reexpansion; the use of urokinase should be reduced as possible according to the postoperative CT scanning results; in patient with poor rinsing and slight fall in the CT values, intracavitary injection of urokinase in hematomas can be performed to dissolve the blood clots; unnecessary extension of the drainage time should be prevented because, for the super-aged patients having severe atrophy of brain, extension of the drainage time cannot facilitate brain reexpansion; instead, it will increase the probability of postoperative complications. Hence, in 1 to 2 days after operation, if the effluent indicates drainage of cerebrospinal fluid, the drainage tubes should be removed; and if no obvious contraindication is observed, oral atorvastatin can be applied to the CSDH patients from the first day after operation. So far, it has been widely accepted that atorvastatin is efficient in stabilizing the newly formed vessels.[3]

Since the treatment with YL-1 puncture needle for the super-aged CSDH patients and the aged patients has similar efficacy, we have sound reasons to recommend that the age limit to the CSDH patients having surgical indications be lowered to 90 or above so that the patients can turn to the surgical treatment with the YL-1 puncture needle, which is a life-saving straw for those patients with ineffective treatment with atorvastatin. Yet, it is preferred to collect a larger number of patients to support the conclusion. According to Chen,[10] the treatment with the YL-1 puncture needle for 697 CSDH patients, including the 98-year-old one(s), has satisfactory efficacy. Thus, the authors of this paper

agree upon Chen's opinion that the treatment method is worth recommending.

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Cutaneous Metastases of the Glioma

Hao Chang, MD,†* *Yasuo Ding, PhD,** *Peng Wang, MD,*† *Qing Wang, PhD,*† *Yuchang Lin, PhD,*† *and Bing Li, PhD*†

Abstract: Low grade glioma (LGG) is a very common primary brain neoplasm with a very good prognosis and the median survival of patients is approximately 8 years. With the development of current treatments such as surgery resection, radiotherapy, and chemotherapy, the recurrence rate and the distant metastasis rate of LGGs are largely decreased. Extracranial metastases are seldom happened. However, the authors present a pathologically proven patient with scalp metastasis, which was metastasized from LGG occurring site to the surgical scar 8 months following initial craniotomy and chemotherapy. The histopathologic examination of the primary site and the recurrent under the scalp are exactly similar. This grade of glioma was increased along with cutaneous metastases. A discussion of a series of the extracranial metastases of the glioma, especially for the surgical considerations, is also provided advice for the cutaneous metastases of the glioma.

Key Words: Cutaneous, glioma, metastases, review

Glioma is the highly aggressive and chemoresistant primary brain tumor, which always has extremely poor prognosis.[1,2] Despite the rapid development of the multimodal therapy, most of those tumors recur.[3] Compared with the recurrence rate of gliomas, the number of the metastasis of this tumor is few, especially for extracranial metastasis.[4] Extracranial metastases to some organs such as pleura, lung, heart, lymph nodes, kidneys, liver, and bone marrow are contingently reported.[4,5] However, cutaneous metastases have seldom reported. Here, we report a rare patient with scalp metastasis of the low grade glioma.

CLINICAL REPORT

A 32-year-old man presented with 2 months history of headache. He has a healthy body and has not any history of disease. Neurological and physical examination on admission demonstrated normal cranial never function, sensation, and strength. Computed tomography revealed a large cystic mass in the bilateral frontal lobe. Magnetic resonance imaging showed a 5 × 6 cm multiloculated cystic lesion had signal intensities as same as that of cerebrospinal fluid (CSF) on T1-weighted imaging and T2-weighted imaging (Fig. 1A-C). The edge of the tumor showed a ring-like enhancement. Then, he denied

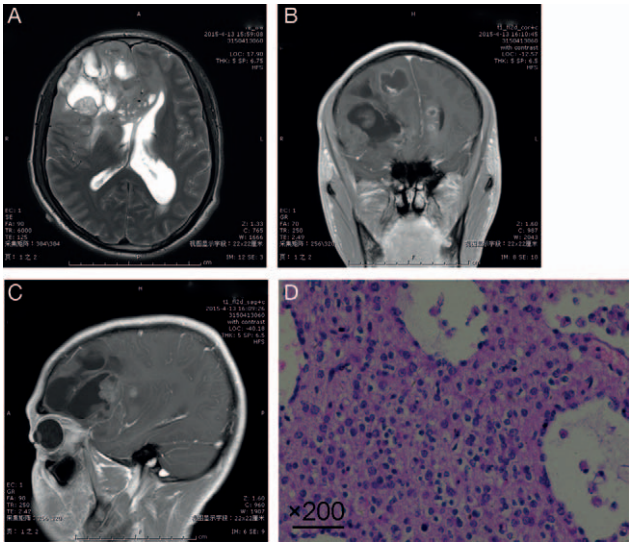

FIGURE 1. (A–C) Preoperative magnetic resonance imaging: a 5 × 6 cm multiloculated cystic lesion had signal intensities as same as that of cerebrospinal fluid on T1-weighted imaging and T2-weighted imaging. (C) Histologic examination showed that there are polygonal tumor cells, round nuclear, different size, and part of bright the cytoplasm. Besides, focal area of cells is intensive, with blood vessel growth, and more sand body (×200).

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