

World Journal of *Clinical Cases*

World J Clin Cases 2021 November 16; 9(32): 9699-10051



Contents

Thrice Monthly Volume 9 Number 32 November 16, 2021

REVIEW

- 9699** Emerging role of long noncoding RNAs in recurrent hepatocellular carcinoma
Fang Y, Yang Y, Li N, Zhang XL, Huang HF

MINIREVIEWS

- 9711** Current treatment strategies for patients with only peritoneal cytology positive stage IV gastric cancer
Bausys A, Gricius Z, Aniukstyte L, Luksta M, Bickaite K, Bausys R, Strupas K

ORIGINAL ARTICLE

Case Control Study

- 9722** Botulinum toxin associated with fissurectomy and anoplasty for hypertonic chronic anal fissure: A case-control study
D'Orazio B, Geraci G, Famà F, Terranova G, Di Vita G
- 9731** Correlation between circulating endothelial cell level and acute respiratory distress syndrome in postoperative patients
Peng M, Yan QH, Gao Y, Zhang Z, Zhang Y, Wang YF, Wu HN

Retrospective Study

- 9741** Effects of early rehabilitation in improvement of paediatric burnt hands function
Zhou YQ, Zhou JY, Luo GX, Tan JL
- 9752** Intracortical screw insertion plus limited open reduction in treating type 31A3 irreducible intertrochanteric fractures in the elderly
Huang XW, Hong GQ, Zuo Q, Chen Q
- 9762** Treatment effects and periodontal status of chronic periodontitis after routine Er:YAG laser-assisted therapy
Gao YZ, Li Y, Chen SS, Feng B, Wang H, Wang Q
- 9770** Risk factors for occult metastasis detected by inflammation-based prognostic scores and tumor markers in biliary tract cancer
Hashimoto Y, Ajiki T, Yanagimoto H, Tsugawa D, Shinozaki K, Toyama H, Kido M, Fukumoto T
- 9783** Scapular bone grafting with allograft pin fixation for repair of bony Bankart lesions: A biomechanical study
Lu M, Li HP, Liu YJ, Shen XZ, Gao F, Hu B, Liu YF
- 9792** High-resolution computed tomography findings independently predict epidermal growth factor receptor mutation status in ground-glass nodular lung adenocarcinoma
Zhu P, Xu XJ, Zhang MM, Fan SF

- 9804** Colorectal cancer patients in a tertiary hospital in Indonesia: Prevalence of the younger population and associated factors

Makmun D, Simadibrata M, Abdullah M, Syam AF, Shatri H, Fauzi A, Renaldi K, Maulahela H, Utari AP, Pribadi RR, Muzellina VN, Nursyirwan SA

- 9815** Association between *Helicobacter pylori* infection and food-specific immunoglobulin G in Southwest China

Liu Y, Shuai P, Liu YP, Li DY

- 9825** Systemic immune inflammation index, ratio of lymphocytes to monocytes, lactate dehydrogenase and prognosis of diffuse large B-cell lymphoma patients

Wu XB, Hou SL, Liu H

Clinical Trials Study

- 9835** Evaluating the efficacy of endoscopic sphincterotomy on biliary-type sphincter of Oddi dysfunction: A retrospective clinical trial

Ren LK, Cai ZY, Ran X, Yang NH, Li XZ, Liu H, Wu CW, Zeng WY, Han M

Observational Study

- 9847** Management of pouch related symptoms in patients who underwent ileal pouch anal anastomosis surgery for adenomatous polyposis

Gilad O, Rosner G, Brazowski E, Kariv R, Gluck N, Strul H

- 9857** Presepsin as a biomarker for risk stratification for acute cholangitis in emergency department: A single-center study

Zhang HY, Lu ZQ, Wang GX, Xie MR, Li CS

Prospective Study

- 9869** Efficacy of Yiqi Jianpi anti-cancer prescription combined with chemotherapy in patients with colorectal cancer after operation

Li Z, Yin DF, Wang W, Zhang XW, Zhou LJ, Yang J

META-ANALYSIS

- 9878** Arthroplasty vs proximal femoral nails for unstable intertrochanteric femoral fractures in elderly patients: a systematic review and meta-analysis

Chen WH, Guo WX, Gao SH, Wei QS, Li ZQ, He W

CASE REPORT

- 9889** Synchronous multiple primary malignancies of the esophagus, stomach, and jejunum: A case report

Li Y, Ye LS, Hu B

- 9896** Idiopathic acute superior mesenteric venous thrombosis after renal transplantation: A case report

Zhang P, Li XJ, Guo RM, Hu KP, Xu SL, Liu B, Wang QL

- 9903** Next-generation sequencing technology for diagnosis and efficacy evaluation of a patient with visceral leishmaniasis: A case report

Lin ZN, Sun YC, Wang JP, Lai YL, Sheng LX

- 9911** Cerebral air embolism complicating transbronchial lung biopsy: A case report
Herout V, Brat K, Richter S, Cundrle Jr I
- 9917** Isolated synchronous Virchow lymph node metastasis of sigmoid cancer: A case report
Yang JQ, Shang L, Li LP, Jing HY, Dong KD, Jiao J, Ye CS, Ren HC, Xu QF, Huang P, Liu J
- 9926** Clinical presentation and management of drug-induced gingival overgrowth: A case series
Fang L, Tan BC
- 9935** Adult with mass burnt lime aspiration: A case report and literature review
Li XY, Hou HJ, Dai B, Tan W, Zhao HW
- 9942** Massive hemothorax due to intercostal arterial bleeding after percutaneous catheter removal in a multiple-trauma patient: A case report
Park C, Lee J
- 9948** Hemolymphangioma with multiple hemangiomas in liver of elderly woman with history of gynecological malignancy: A case report
Wang M, Liu HF, Zhang YZZ, Zou ZQ, Wu ZQ
- 9954** Rare location and drainage pattern of right pulmonary veins and aberrant right upper lobe bronchial branch: A case report
Wang FQ, Zhang R, Zhang HL, Mo YH, Zheng Y, Qiu GH, Wang Y
- 9960** Respiratory failure after scoliosis correction surgery in patients with Prader-Willi syndrome: Two case reports
Yoon JY, Park SH, Won YH
- 9970** Computed tomography-guided chemical renal sympathetic nerve modulation in the treatment of resistant hypertension: A case report
Luo G, Zhu JJ, Yao M, Xie KY
- 9977** Large focal nodular hyperplasia is unresponsive to arterial embolization: A case report
Ren H, Gao YJ, Ma XM, Zhou ST
- 9982** Fine-needle aspiration cytology of an intrathyroidal nodule diagnosed as squamous cell carcinoma: A case report
Yu JY, Zhang Y, Wang Z
- 9990** Extensive abdominal lymphangiomatosis involving the small bowel mesentery: A case report
Alhasan AS, Daqqaq TS
- 9997** Gastrointestinal symptoms as the first sign of chronic granulomatous disease in a neonate: A case report
Meng EY, Wang ZM, Lei B, Shang LH
- 10006** Screw penetration of the iliopsoas muscle causing late-onset pain after total hip arthroplasty: A case report
Park HS, Lee SH, Cho HM, Choi HB, Jo S

- 10013** Uretero-lumbar artery fistula: A case report
Chen JJ, Wang J, Zheng QG, Sun ZH, Li JC, Xu ZL, Huang XJ
- 10018** Rare mutation in MKRN3 in two twin sisters with central precocious puberty: Two case reports
Jiang LQ, Zhou YQ, Yuan K, Zhu JF, Fang YL, Wang CL
- 10024** Primary mucosal-associated lymphoid tissue extranodal marginal zone lymphoma of the bladder from an imaging perspective: A case report
Jiang ZZ, Zheng YY, Hou CL, Liu XT
- 10033** Focal intramural hematoma as a potential pitfall for iatrogenic aortic dissection during subclavian artery stenting: A case report
Zhang Y, Wang JW, Jin G, Liang B, Li X, Yang YT, Zhan QL
- 10040** Ventricular tachycardia originating from the His bundle: A case report
Zhang LY, Dong SJ, Yu HJ, Chu YJ
- 10046** Posthepatectomy jaundice induced by paroxysmal nocturnal hemoglobinuria: A case report
Liang HY, Xie XD, Jing GX, Wang M, Yu Y, Cui JF

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Jalaj Garg, FACC, MD, Academic Research, Assistant Professor, Division of Cardiology, Medical College of Wisconsin, Milwaukee, WI 53226, United States.
garg.jalaj@yahoo.com

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for WJCC as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The WJCC's CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Jia-Hui Li; Production Department Director: Yu-Jie Ma; Editorial Office Director: Jin-Lei Wang.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Thrice Monthly

EDITORS-IN-CHIEF

Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

EDITORIAL BOARD MEMBERS

<https://www.wjnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

November 16, 2021

COPYRIGHT

© 2021 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

Computed tomography-guided chemical renal sympathetic nerve modulation in the treatment of resistant hypertension: A case report

Ge Luo, Jian-Jun Zhu, Ming Yao, Ke-Yue Xie

ORCID number: Ge Luo 0000-0001-6681-9308; Jian-Jun Zhu 0000-0002-5725-7152; Ming Yao 0000-0002-3014-0560; Ke-Yue Xie 0000-0002-6457-2046.

Author contributions: All the authors have assessed the data and are responsible for the integrity and authenticity of the data; Luo G and Xie KY designed the experimental scheme; Zhu JJ was responsible for collating the original data; Luo G and Zhu JJ completed the draft of the manuscript and statistical analysis; Yao M and Xie KY provided technical support and approved the final manuscript.

Informed consent statement: The patient provided informed written consent prior to study enrollment.

Conflict-of-interest statement: All authors declare that they have no conflict of interest.

CARE Checklist (2016) statement: All the authors have read the CARE Checklist (2016), and the manuscript was revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative

Ge Luo, Jian-Jun Zhu, Ming Yao, Ke-Yue Xie, Department of Anesthesiology and Pain, The Affiliated Hospital of Jiaxing University, Jiaxing 314000, Zhejiang Province, China

Corresponding author: Ke-Yue Xie, MD, Doctor, Department of Anesthesiology and Pain, The Affiliated Hospital of Jiaxing University, No. 1882 Zhong-Huan-South Road, Jiaxing 314000, Zhejiang Province, China. ballbe@163.com

Abstract

BACKGROUND

Resistant hypertension (RH) has always been a difficult problem in clinical diagnosis and treatment. At present, there is no recognized safe and effective minimally invasive treatment.

CASE SUMMARY

An 80-year-old woman was admitted to hospital due to trigeminal neuralgia (TN). The patient had a history of RH for more than 10 years and her blood pressure (BP) was not well-controlled. Before the treatment for TN, we decided to perform chemical renal sympathetic denervation with ethanol in the Pain Department of our hospital. One year after the operation, she stopped taking antihypertensive drugs, and her BP was satisfactorily controlled within 4 years after surgery.

CONCLUSION

Computed tomography-guided chemical renal sympathetic modulation may be a feasible method for the treatment of RH.

Key Words: Resistant hypertension; Renal sympathetic denervation; Ethanol; Case report

©The Author(s) 2021. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: We report the use of computed tomography-guided renal sympathetic nerve modulation, for the first time, in the treatment of resistant hypertension in a patient with trigeminal neuralgia.

Citation: Luo G, Zhu JJ, Yao M, Xie KY. Computed tomography-guided chemical renal sympathetic nerve modulation in the treatment of resistant hypertension: A case report. *World J Clin Cases* 2021; 9(32): 9970-9976

Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Specialty type: Nuclear Science and Technology

Country/Territory of origin: China

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): B
Grade C (Good): 0
Grade D (Fair): 0
Grade E (Poor): 0

Received: June 16, 2021

Peer-review started: June 16, 2021

First decision: July 26, 2021

Revised: July 26, 2021

Accepted: September 16, 2021

Article in press: September 16, 2021

Published online: November 16, 2021

P-Reviewer: Prkacin I

S-Editor: Wang JL

L-Editor: Webster JR

P-Editor: Xing YX



URL: <https://www.wjgnet.com/2307-8960/full/v9/i32/9970.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v9.i32.9970>

INTRODUCTION

Hypertension is a common cardiovascular disease. Resistant hypertension (RH) is defined as failure to achieve target blood pressure (BP) when a patient adheres to the maximum tolerated doses of three antihypertensive drugs, including a diuretic[1]. A linear correlation has been established between BP and the risk of cardiovascular events[2]. Although the prevalence of RH has plateaued and decreased in recent years, RH is still common in the hypertensive population[3], and hence, treatment of RH is urgently required. Based on the continuous development of sympathetic modulation, we propose, for the first time, the use of computed tomography (CT)-guided chemical renal sympathetic nerve modulation in the treatment of RH. This provides a novel technique for renal sympathetic denervation (RSD) in the treatment of RH.

CASE PRESENTATION

Chief complaints

We report an 80-year-old female patient with paroxysmal pain in the right maxillary region for > 20 years, which was aggravated for six months.

History of present illness

Twenty years ago, without obvious inducement, the patient developed right facial pain, which was located in the maxillary region. The pain was paroxysmal, which could be induced when brushing her teeth and eating. During the past six months, the pain was aggravated and seriously affected her quality of life.

History of past illness

The patient had a history of RH for > 10 years, with the highest BP of 200/120 mmHg. We found that she did not take her medication according to the instructions and only took amlodipine besylate 5 mg/d, and the efficiency of this treatment was unsatisfactory. She also had a history of diabetes for more than 10 years.

Personal and family history

No relevant personal or family history.

Physical examination

Physical examination was normal.

Laboratory examinations

Laboratory examinations were normal.

Imaging examinations

Imaging examinations were normal.

FINAL DIAGNOSIS

The final diagnosis was trigeminal neuralgia (the second branch), RH, diabetes.

TREATMENT

She was scheduled to undergo radiofrequency thermocoagulation of the trigeminal nerve. The BP of the right upper limb was measured for the first time as 210/108 mmHg. Hence, 10 mg nitroglycerin (0.2 mg/mL) was injected intravenously at a speed of 5 mL/h. BP was continuously monitored until and after it was stable.

After consultation with the cardiologists, we added valsartan hydrochlorothiazide (each containing valsartan 80 mg, hydrochlorothiazide 12.5 mg) and amlodipine besylate 10 mg/d. The mean blood pressure (MBP) within 24 h was 172/73 mmHg, and from 6 a.m.–10 p.m. was 176/77 mmHg, and from 10 p.m.–6 a.m. was 168/70 mmHg. In order to ensure the safety of the operation, we used RSD in the treatment of RH. Although CT-guided percutaneous puncture was easily performed, locating the renal artery under the guidance of CT was the key to success, and then anhydrous ethanol was used to modulate the renal sympathetic nerve in the adventitia of the renal artery to achieve renal denervation.

The patient was placed in the prone position and monitored. After a single CT scan, the depth and angle of the puncture needle were measured. When the puncture point was determined, the body surface was marked. After local infiltration anesthesia, the puncture was made according to the proposed path. After several adjustments, the puncture needle was finally close to the renal artery or adjacent to the abdominal aorta (Figure 1). When the return pump was determined to be free of blood, gas, and liquid, a mixture of 30% iohexanol (1 mL) and 1% lidocaine (4 mL) was injected, and the diffusion of anhydrous ethanol was observed after the CT scan confirmed the decrease in lidocaine and iohexanol. The diffusion of anhydrous ethanol was observed after the injection of ethanol (containing 0.9 mL ethanol and 30% iohexanol 0.1 mL) (Figure 2). All vital signs were stable after 20 min, and the patient was sent back to the ward.

OUTCOME AND FOLLOW-UP

The patient's BP before and after the operation was recorded for 11 d (Figure 3A). The MBP 3 d before the operation was 109 mmHg, which was defined as the baseline, and the MBP for 8 consecutive days after the operation was approximately 88 mmHg. Therefore, the short-term effect of chemical renal sympathetic modulation could be expected in the treatment of RH. In addition, we followed up this case for 4 years and the use of antihypertensive drugs is listed on Table 1. A telephone follow-up was conducted every 6 mo after discharge. Compared to the baseline, the decrease in systolic blood pressure at each interval within 4 years was -37 mmHg, and that in diastolic blood pressure and MBP was -9 mmHg and -19 mmHg, respectively. Figure 3B shows the changing trends in BP over 4 years.

DISCUSSION

The sympathetic nervous system plays a major role in the regulation of BP and the formation of hypertension[4-6], which in turn, are regulated by changing cardiac output, vascular resistance, and the renin-angiotensin-aldosterone system. Activation of the renal sympathetic nerve significantly increases the absorption of sodium, renal vascular resistance and promotes the release of renin in the kidney[7,8]. Both animal experiments and clinical studies have proved that renal denervation reduces BP to a certain extent[9-12]. The treatments for RH include ultrasound therapy, neurotoxin injection, and radiofrequency ablation; of these, catheter-based radiofrequency renal-nerve ablation (CBRNA) is a mature and well-studied technique[13]. The catheter is withdrawn 1–2 cm and circumferentially rotated with further radiofrequency energy applications performed in this way, such that 4–6 applications on average are applied to the renal artery[14]. However, the heat produced during radiofrequency ablation might damage the renal artery and cause diffuse vasospasm and thrombosis[15,16], thereby necessitating the postoperative evaluation of renal arteriography. Sufficient evidence is lacking to support the long-term effect, safety, and other related complications of CBRNA.

Fischell *et al*[17] reported a method for renal denervation which involved injecting anhydrous ethanol into the adventitia. Later, the first human trial was carried out, and its safety and feasibility were proved[18]. However, like CBRNA, these methods were performed using a transcatheter puncture, and renal vascular injury is a common and severe risk in such surgery. In addition, if ethanol is inadvertently injected into a blood vessel, it can cause adverse events, such as embolism.

For several years, we have been exploring the treatment of sympathetically-driven diseases[19-21]. In this case, the application of CT-guided chemical renal sympathetic modulation for RH is reported for the first time. We attempted to transfer the therapeutic target from the lumbar sympathetic chain to the renal artery. During the perioperative period, the decrease in BP on the day of surgery was maximal, and the

Table 1 Evaluation of the measurements of blood pressure, drugs and complications

Time intervals	Blood pressure (mmHg)			Heart rate (bpm)	Antihypertensive drugs	Complications
	SP	DP	MBP			
Pre-3 d ¹	178	74	109	87	Valsartan 80 mg; hydrochlorothiazide; 12.5 mg; amlodipine besylate 10 mg	Headache
Operation	117	60	79	65	None	None
Post-1 d	133	62	86	71	Valsartan 80 mg; hydrochlorothiazide; 12.5 mg; amlodipine besylate 10 mg	None
Post-2 d	151	69	96	73	Valsartan 80 mg; hydrochlorothiazide; 12.5 mg; amlodipine besylate 10 mg	None
Post-3 d	143	66	92	76	valsartan 80 mg; hydrochlorothiazide; 12.5 mg; amlodipine besylate 10 mg	None
Post-1 yr	137	65	89	69	Amlodipine besylate 10 mg	None
Post-2 yr	134	64	87	73	Amlodipine besylate 10 mg	None
Post-3 yr	145	71	96	77	Amlodipine besylate 10 mg	None
Post-4 yr	145	64	91	74	None	None

¹Blood pressure and use of drugs 3 d before the operation were regarded as baseline. SP: Systolic pressure; DP: Diastolic pressure; MBP: Mean blood pressure.

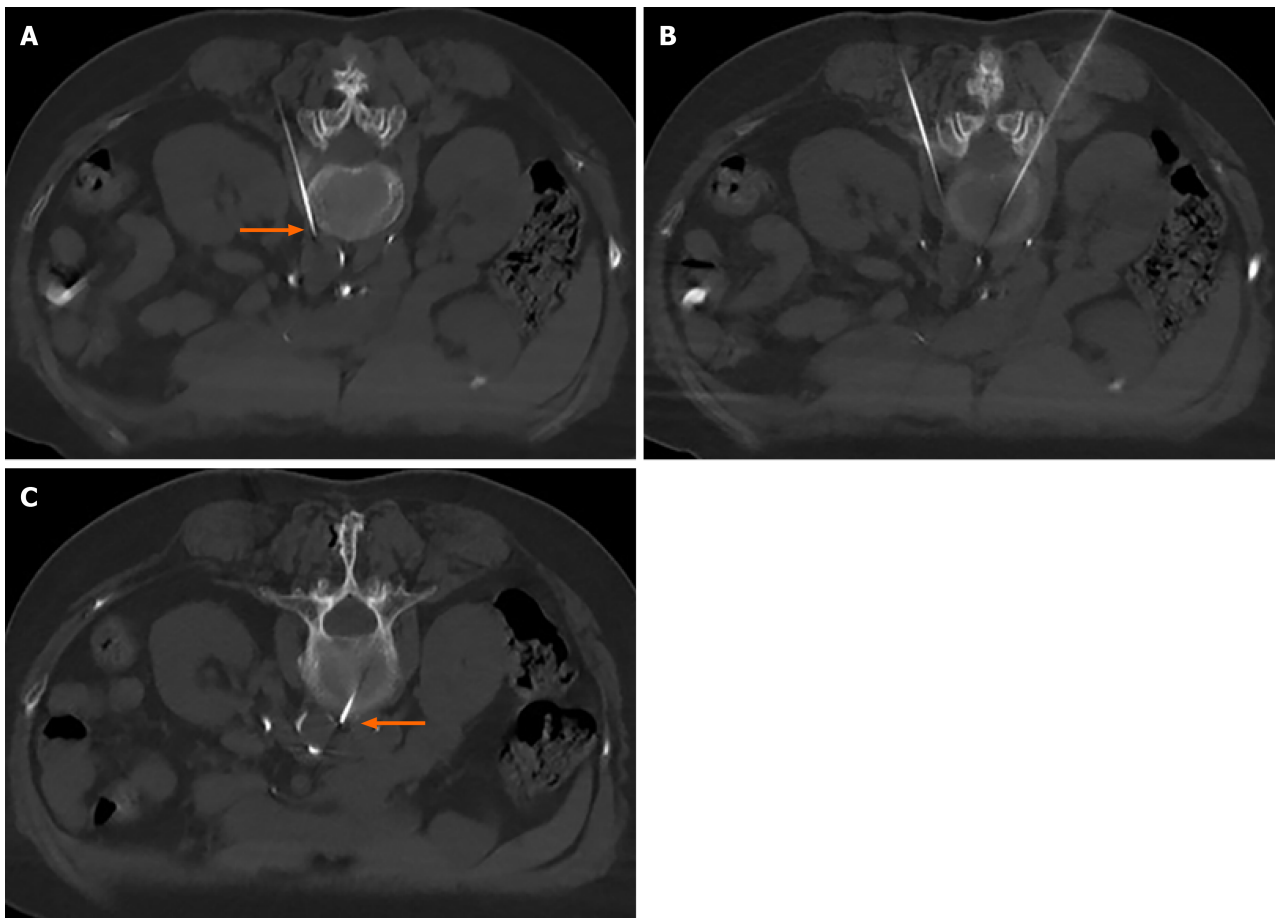


Figure 1 The puncture needle entering the target. The position of the puncture needle in the same sequence from different levels. The arrows show the tip of the puncture needle.

decrease in MAP was 24 mmHg; the lowest value was 134 mmHg for four years, and the average decrease in BP in the fourth year was -37.5/-11 mmHg.

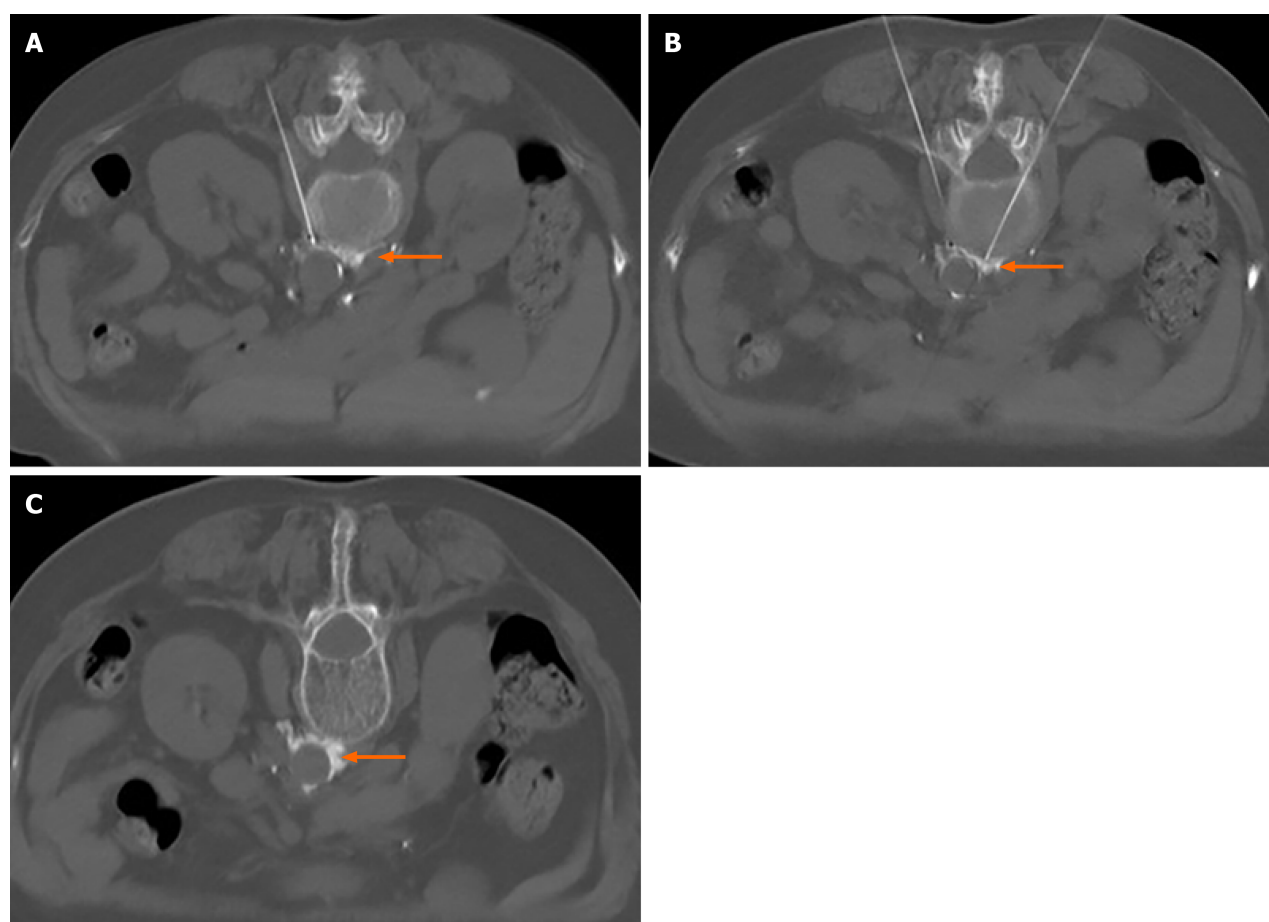


Figure 2 Injection and diffusion of anhydrous ethanol. The arrows show the anhydrous ethanol.

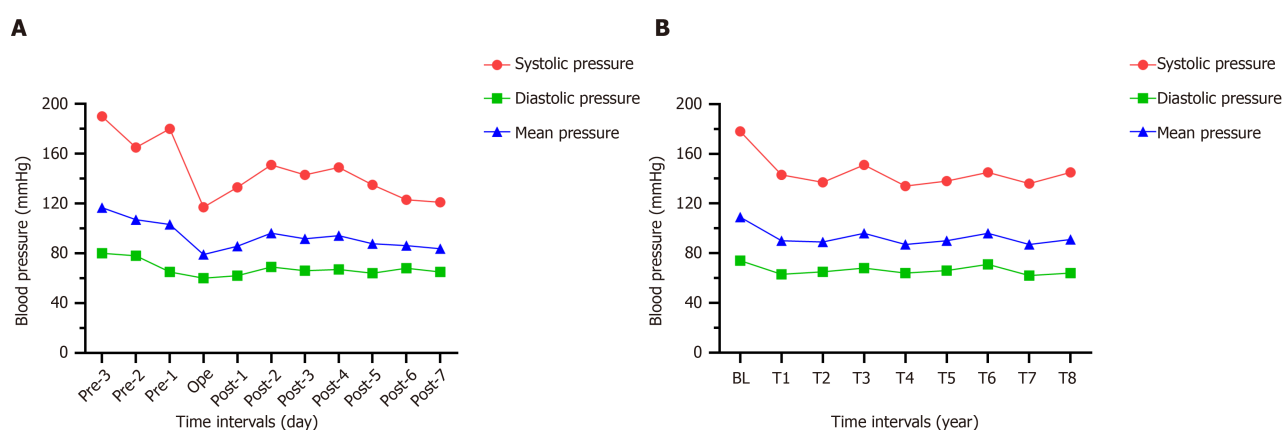


Figure 3 The changing trends in blood pressure at different intervals during the perioperative period of 11 d and 4 years after the operation. A: The perioperative period of 11 d; B: 4 yr after the operation. Blood pressure was recorded every 6 mo for 4 yr after the operation. BL: Blood pressure during the 3 d before the operation; T1: Post-0.5 yr; T2: Post-1 yr; T3: Post-1.5 yr; T4: Post-2 yr; T5: Post-2.5 yr; T6: Post-3 yr; T7: Post-3.5 yr; T8: Post-4 yr.

We speculated that compared to classical transcatheter renal denervation, CT-guided chemical renal sympathetic nerve modulation has several advantages. First, the operation could be completed by percutaneous puncture without the need to insert a catheter, and hence the risks such as blood infection and thrombosis could be avoided. In addition, CBRNA often uses the method of multipoint radiofrequency ablation, but we do not think that the annular area formed by multiple radiofrequencies can cover all the branches of the renal sympathetic nerve around the renal artery, which could be due to the poor effect in some patients after CBRNA. However, due to diffusion, anhydrous ethanol is uniformly distributed around the adventitia of the renal artery after injection of anhydrous ethanol containing contrast agent (Figure 2). In addition,

under the guidance of CT, the right puncture needle reaches the target through the erector muscle and intervertebral disc, while the other needle reaches between the lateral side of the abdominal aorta and the anterolateral edge of the lumbar vertebra and near the renal artery. Both sides of the puncture process avoid the kidney and celiac vessels. The incidence of puncture-related complications was low, and chemical modulation was achieved without causing vascular intimal injury. After the operation, we did not perform renal angiography to eliminate the risk of renal artery injury, which has good safety.

The difficulty of this technique lies in the puncture process. CT clarified the correlation between the puncture needle and adjacent important blood vessels or organs. Based on the determination of angle and depth, an ideal puncture path is designed to reduce the times of needle adjustment in the puncture process as much as possible. In addition, vascular damage may cause local hematoma or hemorrhagic shock during the puncture, and anhydrous ethanol should be injected cautiously. Repeated withdrawal should be carried out before injection to ensure that no blood, gas, and other liquids are drawn. Moreover, if, after injection of the mixture of local anesthetic and contrast medium, the contrast medium is not seen on CT scanning, it is necessary to readjust the position of the puncture needle. Also, it is necessary to focus on the possibility that anhydrous ethanol spreads along the interstitial space after injection and can cause adjacent nerve injury[22]. At this time, diluting ethanol with an appropriate amount of saline may be an emergency measure. Embolism caused by the injection of anhydrous ethanol into blood vessels may be the most severe complication. The introduction of CT provides an effective guarantee for the safety of the puncture, and the withdrawal before injection and controlling the amount of anhydrous ethanol are critical measures to reduce the incidence of complications. Overall, simple operation, less trauma, and low surgical risk are the unique advantages of this technique. We have followed up this case for a period of 4 years to provide evidence for the long-term effect of surgical treatment.

The purpose of this case report was to propose a novel, safe, and effective technique to provide a new minimally invasive treatment for the clinical therapy of RH. Thus, we speculate that the expansion of sample size and randomized controlled trials would provide convincing conclusions.

CONCLUSION

CT-guided chemical renal sympathetic modulation may be a feasible method for the treatment of RH. Randomized controlled trials may provide more reliable conclusions.

REFERENCES

- 1 Sarafidis PA, Bakris GL. Resistant hypertension: an overview of evaluation and treatment. *J Am Coll Cardiol* 2008; **52**: 1749-1757 [PMID: 19022154 DOI: 10.1016/j.jacc.2008.08.036]
- 2 Doroszko A, Janus A, Szahidewicz-Krupska E, Mazur G, Derkacz A. Resistant Hypertension. *Adv Clin Exp Med* 2016; **25**: 173-183 [PMID: 26935512 DOI: 10.17219/acem/58998]
- 3 Sinnott SJ, Smeeth L, Williamson E, Douglas IJ. Trends for prevalence and incidence of resistant hypertension: population based cohort study in the UK 1995-2015. *BMJ* 2017; **358**: j3984 [PMID: 28939590 DOI: 10.1136/bmj.j3984]
- 4 Thomas P, Dasgupta I. The role of the kidney and the sympathetic nervous system in hypertension. *Pediatr Nephrol* 2015; **30**: 549-560 [PMID: 24609827 DOI: 10.1007/s00467-014-2789-4]
- 5 Komnenov D, Levanovich PE, Rossi NF. Hypertension Associated with Fructose and High Salt: Renal and Sympathetic Mechanisms. *Nutrients* 2019; **11** [PMID: 30866441 DOI: 10.3390/nu11030569]
- 6 DeLallo LJ, Sved AF, Stocker SD. Sympathetic Nervous System Contributions to Hypertension: Updates and Therapeutic Relevance. *Can J Cardiol* 2020; **36**: 712-720 [PMID: 32389344 DOI: 10.1016/j.cjca.2020.03.003]
- 7 Dumas M, Faselis C, Papademetriou V. Renal sympathetic denervation and systemic hypertension. *Am J Cardiol* 2010; **105**: 570-576 [PMID: 20152255 DOI: 10.1016/j.amjcard.2009.10.027]
- 8 Johns EJ, Kopp UC, DiBona GF. Neural control of renal function. *Compr Physiol* 2011; **1**: 731-767 [PMID: 23737201 DOI: 10.1002/cphy.c100043]
- 9 Li P, Huang PP, Yang Y, Liu C, Lu Y, Wang F, Sun W, Kong XQ. Renal sympathetic denervation attenuates hypertension and vascular remodeling in renovascular hypertensive rats. *J Appl Physiol* (1985) 2017; **122**: 121-129 [PMID: 27742806 DOI: 10.1152/jappphysiol.01019.2015]
- 10 Oosterhuis NR, Fernandes R, Maicas N, Bae SE, Pombo J, Gremmels H, Poston L, Joles JA, Samuelsson AM. Extravascular renal denervation ameliorates juvenile hypertension and renal damage

- resulting from experimental hyperleptinemia in rats. *J Hypertens* 2017; **35**: 2537-2547 [PMID: 28704264 DOI: 10.1097/HJH.0000000000001472]
- 11 **Krum H**, Schlaich M, Whitbourn R, Sobotka PA, Sadowski J, Bartus K, Kapelak B, Walton A, Sievert H, Thambar S, Abraham WT, Esler M. Catheter-based renal sympathetic denervation for resistant hypertension: a multicentre safety and proof-of-principle cohort study. *Lancet* 2009; **373**: 1275-1281 [PMID: 19332353 DOI: 10.1016/S0140-6736(09)60566-3]
- 12 **Esler M**. Renal denervation for hypertension: observations and predictions of a founder. *Eur Heart J* 2014; **35**: 1178-1185 [PMID: 24598982 DOI: 10.1093/eurheartj/ehu091]
- 13 **Krum H**, Sobotka P, Mahfoud F, Böhm M, Esler M, Schlaich M. Device-based antihypertensive therapy: therapeutic modulation of the autonomic nervous system. *Circulation* 2011; **123**: 209-215 [PMID: 21242507 DOI: 10.1161/CIRCULATIONAHA.110.971580]
- 14 **Krum H**, Schlaich M, Sobotka P. Renal sympathetic nerve ablation for treatment-resistant hypertension. *Br J Clin Pharmacol* 2013; **76**: 495-503 [PMID: 23819768 DOI: 10.1111/bcp.12171]
- 15 **Lobo MD**, Sobotka PA, Pathak A. Interventional procedures and future drug therapy for hypertension. *Eur Heart J* 2017; **38**: 1101-1111 [PMID: 27406184 DOI: 10.1093/eurheartj/ehw303]
- 16 **Templin C**, Jaguszewski M, Ghadri JR, Sudano I, Gaehwiler R, Hellermann JP, Schoenenberger-Berzins R, Landmesser U, Erne P, Noll G, Lüscher TF. Vascular lesions induced by renal nerve ablation as assessed by optical coherence tomography: pre- and post-procedural comparison with the Simplicity catheter system and the EnligHTN multi-electrode renal denervation catheter. *Eur Heart J* 2013; **34**: 2141-2148, 2148b [PMID: 23620498 DOI: 10.1093/eurheartj/ehd141]
- 17 **Fischell TA**, Vega F, Raju N, Johnson ET, Kent DJ, Ragland RR, Fischell DR, Almany SL, Ghazarossian VE. Ethanol-mediated perivascular renal sympathetic denervation: preclinical validation of safety and efficacy in a porcine model. *EuroIntervention* 2013; **9**: 140-147 [PMID: 23685302 DOI: 10.4244/EIJV9I1A20]
- 18 **Fischell TA**, Ebner A, Gallo S, Ikeno F, Minarsch L, Vega F, Haratani N, Ghazarossian VE. Transcatheter Alcohol-Mediated Perivascular Renal Denervation With the Peregrine System: First-in-Human Experience. *JACC Cardiovasc Interv* 2016; **9**: 589-598 [PMID: 27013159 DOI: 10.1016/j.jcin.2015.11.041]
- 19 **Guo JG**, Fei Y, Huang B, Yao M. CT-guided thoracic sympathetic blockade for palmar hyperhidrosis: Immediate results and postoperative quality of life. *J Clin Neurosci* 2016; **34**: 89-93 [PMID: 27473024 DOI: 10.1016/j.jocn.2016.05.031]
- 20 **Liu M**, Ni H, Tao J, Xie K. Lumbar Sympathetic Nerve Modulation Using Absolute Ethanol for the Treatment of Primary Lower-Extremity Hyperhidrosis: A Dose-Effect Pilot Study. *Med Sci Monit* 2021; **27**: e928209 [PMID: 33434188 DOI: 10.12659/MSM.928209]
- 21 **Huang B**, Sun K, Zhu Z, Zhou C, Wu Y, Zhang F, Yan M. Oximetry-derived perfusion index as an early indicator of CT-guided thoracic sympathetic blockade in palmar hyperhidrosis. *Clin Radiol* 2013; **68**: 1227-1232 [PMID: 23969155 DOI: 10.1016/j.crad.2013.07.003]
- 22 **Pennekamp W**, Krumova EK, Feigl GP, Frombach E, Nicolas V, Schwarzer A, Maier C. Permanent lesion of the lateral femoral cutaneous nerve after low-volume ethanol 96% application on the lumbar sympathetic chain. *Pain Physician* 2013; **16**: 391-397 [PMID: 23877455]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

