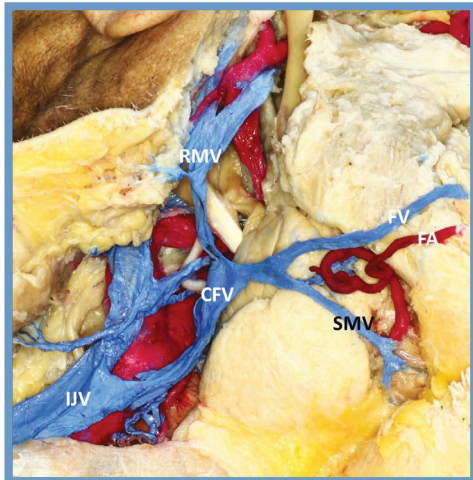
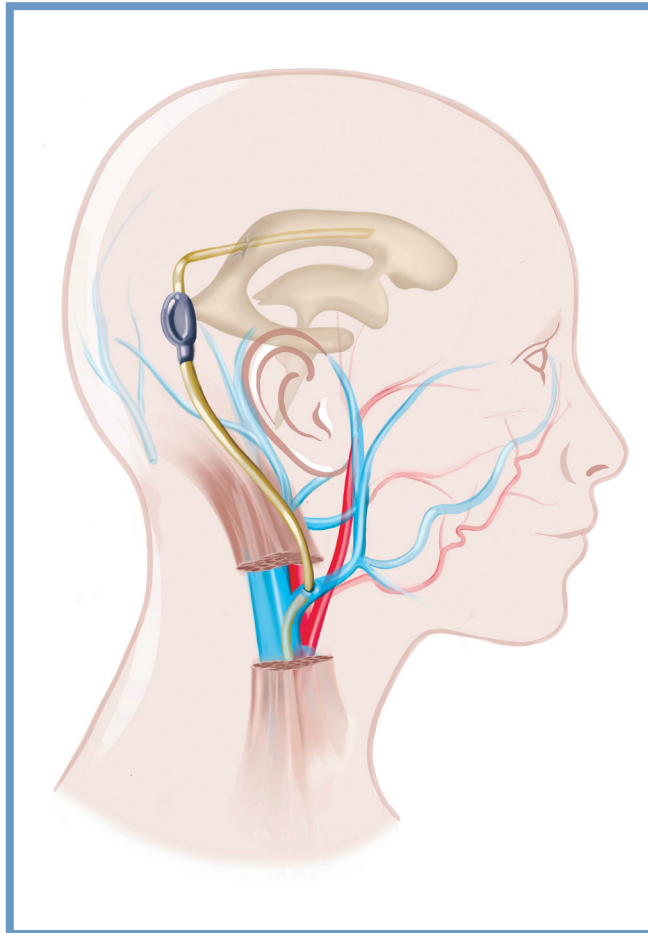




Turkish Neurosurgery

Official Journal of the Turkish Neurosurgical Society





Turkish Neurosurgery

Official Journal of the Turkish Neurosurgical Society

TURKISH NEUROSURGICAL SOCIETY

Volume: 32 Number: 1 Year: 2022

www.turkishneurosurgery.org.tr

PRESIDENTS

Nurhan Avman	1985-1986
Aykut Erbenği	1986-1987
Özdemir Gürçay	1988-1988
Tunçalp Özgen	1988-1989
Yücel Kanpolat	1989-1990
Osman E. Özcan	1990-1992
Ertekin Arasil	1992-1993
Yamaç Taşkın	1993-1995
Yücel Kanpolat	1995-1996
Nur Altınörs	1996-1997
M. Kemali Baykaner	1997-1998
Kaya Aksoy	1998-2000
Necmettin Pamir	2000-2002
Nurcan Özdamar	2002-2004
Selçuk Palaoğlu	2004-2006
Mehmet Zileli	2006-2008
Ethem Beşkonaklı	2008-2010
Murad Bavbek	2010-2012
Uğur Türe	2012-2014
Zeki Şekerci	2014-2016
Talat Kırış	2016-2017
Şükrü Çağlar	2017-2018
Savaş Ceylan	2018-2021
Emel Avci	2021-

EDITORS

Tunçalp Özgen	1989-1989
Yücel Kanpolat	1989-1990
Osman E. Özcan	1990-1992
Selçuk Palaoğlu	1992-1994
Nur Altınörs	1994-1995
Selçuk Palaoğlu	1995-1996
Zafer Kars	1996-1998
Kaya Aksoy	1998-2000
Murad Bavbek	2000-2003
Erdener Timurkaynak	2003-2004
Kemal Benli	2004-2006
Hakan Caner	2007-2013
Deniz Belen	2014-2015
Talat Kırış	2015-2016
Selçuk Peker	2016-2018
Cem Yılmaz	2018-

Turkish Neurosurgery has been accepted for indexing in: SCIENCE CITATION INDEX EXPANDED, INDEX MEDICUS, MEDLINE, PubMed, Scopus, TR Index, Islamic World Science Citation Center (ISC)

Impact Factor : 1.003

5yr-Impact Factor : 1.107

ISI Web of KnowledgeSM, Journal Citation Reports[®], 2020 JCR Science Edition

Editor-in-Chief:

Cem Yılmaz : cemerimiyilmaz@gmail.com

Section Editors:

Dattatraya Muzumdar (Neurooncology)	: dmuzumdar@hotmail.com
Hidekazu Kobayashi (Cerebrovascular Surgery)	: hidek-fchs@kbh.biglobe.ne.jp
Gianpiero Tamburrini (Pediatric Neurosurgery)	: gianpiero.tamburrini@rm.unicatt.it
R. Kemal Koç (Spinal Surgery)	: kocrk@erciyes.edu.tr
Ahmet Bekar (Functional Neurosurgery)	: dr_ahmet_bekar@hotmail.com
Andreas Unterberg (Neurotrauma)	: andreas.unterberg@med.uni-heidelberg.de
Hakan Karabağlı (General Neurosurgery)	: hakankarabaqli@yahoo.com

Associate Editors:

Selim Ayhan : selim_ayhan@yahoo.com	Bora Güner : boraguner@gmail.com
Erdinç Civelek : civsurgeon@yahoo.com	Ender Köktekir : enderkoktekirns@hotmail.com
Emrah Çeltikçi : drceltikci@gmail.com	Emre Özkara : dremreozkara@gmail.com
Uygur Er : uygurer@gmail.com	Fikret Şahintürk : fikretsahinturk@gmail.com

Medical Ethics Advisor:

Dr. Nesrin Çobanoğlu

ADVISORY BOARD

Aviva Abosch, USA	Murat Hancı, Turkey	James T. Rutka, Canada
Feridun Acar, Turkey	Juha Hernesniemi, Finland	Burak Sade, Turkey
Gökhan Akdemir, Turkey	Servet İnci, Turkey	Madjid Samii, Germany
Nejat Akalan, Turkey	Juha E Jääskeläinen, Finland	Ali Savaş, Turkey
Ossama Al-Mefty, USA	Erkan Kaptanoğlu, Turkey	Daniel Sciubba, USA
Nur Altınörs, Turkey	Feyza Karagöz Güzey, Turkey	Laligam Sekhar, USA
Nuri Arda, Turkey	Takesi Kawase, Japan	Nathan Selden, USA
Ali Arslantaş, Turkey	Andrew H. Kaye, Australia	Franco Servadei, Italy
Emel Avci, Turkey	Memduh Kaymaz, Turkey	Konstantin V. Slavin, USA
Mustafa K. Başkaya, USA	M. Yaşar Kaynar, Turkey	İhsan Solaroğlu, Turkey
Murad Bavbek, Turkey	Evren Keleş, Turkey	Robert F. Spetzler, USA
Ahmet Bekar, Turkey	Douglas Kondziolka, USA	Alparslan Şenel, Turkey
Ahmet Deniz Belen, Turkey	Basant Kumar Misra, India	Sait Şirin, Turkey
Edward C. Benzel, USA	Boris Krischek, Germany	Necmettin Tanrıöver, Turkey
Mustafa Berker, Turkey	Ali Kristit, USA	Marcos Tatagiba, Germany
Ethem Beşkonaklı, Turkey	Christer Lindquist, UK	Yasin Temel, The Netherlands
Luis Borba, Brasil	L. Dade Lunsford, USA	Nicolas De Tribolet, Switzerland
Kim Burchiel, USA	Jacques Morcos, USA	Uğur Türe, Turkey
Paolo Capabianca, Italy	Melike Mut, Turkey	Tanju Uçar, Turkey
Fady Charbel, USA	Sait Naderi, Turkey	Ağahan Ünlü, Turkey
Şükrü Çağlar, Turkey	Kenji Ohata, Japan	Peter Vajkoczy, Germany
Mehmet Daneyemez, Turkey	Nezih Oktar, Turkey	M. Gazi Yaşargil, Turkey
Gilbert Deschambenoit, France	Fahir Özer, Turkey	Selçuk Yılmazlar, Turkey
İlhan Elmacı, Turkey	Selçuk Palaoğlu, Turkey	Mehmet Zileli, Turkey
Micheal Fehlings, Canada	Necmettin Pamir, Turkey	İbrahim M. Ziyal, Turkey
Atul Goel, India	Lukas Rasulic, Serbia	
Ziya Gökaslan, USA	Guilherme Carvalhal Ribas, Brasil	
Murat Günel, USA	Concezio Di Rocco, Italy	

Reference Check: Betül Kartal

Secretary : Mukadder Karakaya Çerçi, Nurhan Şen

Plagiarism Report: Hüseyin Körpeoğlu

Web Site Design: Pleksus Information Technology

Turkish Neurosurgery

Volume: 32 Number: 1 Year: 2022

Official Journal of the Turkish Neurosurgical Society

Turkish Neurosurgery is published six times per year (bimonthly) by the Turkish Neurosurgical Society (January, March, May, July, September, and November)

Owned and controlled by the Turkish Neurosurgical Society

Copyright owner on behalf of the Turkish Neurosurgical Society:
Emel AVCI

Publishing Manager:
Ilker SOLMAZ

Key title: Turkish Neurosurgery
Abbreviated key title: Turk Neurosurg
www.turkishneurosurgery.org.tr

ISSN: 1019-5149, **E-ISSN:** 2651-5032
NLM ID: 9423821

Turkish Neurosurgery is an open access and totally free journal.
All electronic materials can be found on internet without any charge. Please visit: <http://www.turkishneurosurgery.org.tr/>
2021 Subscription Rates for Printed Materials:
Within Turkey 1000 TL (shipping costs not included); Outside Turkey 100 € (shipping costs not included)
For further information and questions; please contact: bulus@bulustasarim.com.tr

Page layout and publishing services

BULUŞ DESIGN AND PRINTING SERVICES COMPANY
Bahriye Üçok Caddesi 9/1 Beşevler, 06500 Ankara, Turkey
Phone: +90 312 222 44 06 Fax: +90 312 222 44 07
E-mail: bulus@bulustasarim.com.tr

Advertisement: editor@turkishneurosurgery.org.tr

Publishing Date: 12.01.2022

Cover picture: Ozener, p. 124

Turkish Neurosurgical Society
Taşkent Caddesi 13/4 06500 Bahçelievler, Ankara/TURKEY
Phone: +90 312 212 64 08 Fax : +90 312 215 46 26
E-mail: info@turknorosirurji.org.tr
www.turknorosirurji.org.tr www.turkishneurosurgery.org.tr

Yayın Türü: Yaygın süreli yayın

Yayın Sahibi: Türk Nöroşirürji Derneği adına Emel AVCI

Sorumlu Yazı İşleri Müdürü: Ilker SOLMAZ

5187 Sayılı Basın Yasasının 7. maddesi uyarınca dergi künyesinin Türkçesi belirtilmiştir.

Review of the articles in the journal to make sure they conform to publishing standards, typesetting, getting the journal ready for publication and finally the publishing process has been the responsibility of Buluş Design and Printing Services Company.

The paper used to print this journal conforms to ISO 9706: 1994 standard (Requirements for Permanence).
The National Library of Medicine suggests that biomedical publications be printed on acid-free paper (alkaline paper).



ENVIRONMENTAL INFORMATION

The company that manufactures the paper used in this journal has an ISO 14001 environmental management certificate. The company obtains all wood fiber in a sustainable manner. The forests and plantations of the company are certified. The water used in production is purified and used after recovery.

Heavy metals or film are not used for the publication of this journal. The fluids used for developing the aluminum printing templates are purified. The templates are recycled. The inks used for printing do not contain toxic heavy metals.

This journal can be recycled. Please dispose of it in recycling containers.

INSTRUCTION TO THE AUTHORS

Journal Description

Turkish Neurosurgery is a peer-reviewed, multidisciplinary, open access and totally free journal directed at an audience of neurosurgery physicians and scientists. The official language of the journal is *English*. The journal publishes original articles in the form of clinical and basic research. *Turkish Neurosurgery* will only publish studies that have institutional review board (IRB) approval and have strictly observed an acceptable follow-up period. With the exception of reference presentation, *Turkish Neurosurgery* requires that all manuscripts be prepared in accordance with the *Uniform Requirements for Manuscripts Submitted to Biomedical Journals*.

Turkish Neurosurgery periodically publishes the following papers: Research (Original Investigation, Clinical and Experimental Studies), Review Article, Case Report, Letter to Editor, Technical Note and Turkish Neuro-Excursion.

Our mission is providing a scientific forum relevant to neurosurgeons and health care providers.

Open Access Policy

Science is and should be free.

As the Turkish Neurosurgery Journal, we believe science is a common denominator of the humanity which should be publicly available and free. Since its establishment in 1989, all our effort and workforce were based on volunteers and their efforts. We have never been a profit seeking organization. Turkish Neurosurgery is a non-profit scientific publishing organization and it is the official journal of Turkish Neurosurgical Society.

Turkish Neurosurgery is and will be an open access journal which no one is required to pay for publishing or accessing its content. Turkish Neurosurgery does not demand any publication, accession or figure fee from authors or readers.

Manuscript Submission

Authors are to submit their manuscripts through the web based tracking system at <http://www.turkishneurosurgery.org.tr>. The site contains instructions and advice on how to submit manuscripts, guidance on the creation / scanning and saving of electronic art and supporting documentation. **ORCID** identifier (ID) is required for **ALL** authors during the submission process. **ORCID ID** can be obtained free of charge at <http://orcid.org>. **E-mail address of all authors** should also be provided during the submission process. In addition to allowing authors to submit manuscripts on the web, the site allows authors to follow the progression of their manuscript through the peer review process. Authors who submit their manuscripts through the web-based tracking system are asked **not** to send hard copies of the manuscript to the editorial office. Please address all inquiries regarding manuscripts not yet accepted or published to the Journal's

editorial office. The editorial office will acknowledge receipt of your manuscript and will send you a manuscript number for reference.

Before submission please ensure that:

One author has been designated as the correspondent with full contact details including e-mail address, postal address and phone number. In any case of editorial board could not contact with the corresponding author, Turkish Neurosurgery journal have the right to decide what is appropriate.

Submission Checklist;

- 1) Your title page is in .doc or .docx format, includes title of your manuscript, author names, affiliations and ORCID numbers; name and full contact information of corresponding author, running title, keywords, and authorship contribution statements-the latter can be found on the Copyright transfer and authorship contribution statement Form. Please be sure that authorship contribution statements are presented in the form as well as in the title page. Of note, authors should indicate conflicts of interest relating to their research-if any. The Journal is not responsible for published misspelled names due to author error and the title page **must be uploaded as a separate file**. Running Head in the title page should be no more than three to five words from the title, and should NOT include the authors' names.
- 2) Your main document is in .doc or .docx format includes **structured abstract, key words, abbreviation list, structured main text, disclosure and conflicts of interest, references and figure legends** sections in this order. Structured main text should be organized as **Introduction, Material and Methods, Results, Discussion, and Conclusion**. Do not add any information about institution names. Also do not add figures and tables in the main document. **Be sure your main document is written in Calibri or Times New Roman, line gap set to double spaced and justified on both sides**. Journal's official language is English. Refer to drugs and therapeutic agents by their accepted generic or chemical names, and do not abbreviate them. Use code numbers only when a generic name is not yet available. In that case, supply the chemical name and a figure giving the chemical structure of the drug. Capitalize the trade names of drugs and place them in parentheses after the generic names. To comply with trademark law, include the name and location (city and country) of the manufacturer of any drug, supply, or equipment mentioned in the manuscript. Use the metric system to express the units of measure and degrees Celsius to express temperatures, and SI units rather than conventional units. Define abbreviations at first mention in text and in each table and figure. If a brand name is cited, supply the manufacturer's name and address (city and state/country).

- 3) All your figures are in **TIFF** format. Color figures should have a resolution of at least **300 dpi**, black and white figures should have a resolution of at least **600 dpi**. Turkish Neurosurgery does not demand any color figure fee.
- 4) All your video files are in .mpeg and .mp4 format, not longer than 10 minutes, and not bigger than 40 MB. Video files should include an embedded audio narration and subtitles in English.
- 5) All your tables are in .doc or .docx format, created using the table creating and editing feature of the word processing software. Do not use Excel or comparable software. Upload a single text file which includes **ALL the tables in separate pages**. Cite tables consecutively in the text, and number them in that order. Key each on a separate sheet, include the table title, appropriate column heads, and explanatory legends (including definitions of any **abbreviations** used). Do not embed tables within the main text.

If your manuscript does not meet these requirements, manuscript **WILL BE RETURNED** to the corresponding author for technical revision before undergoing peer review.

Submission Steps

1. Upload signed copyright form by the corresponding author which is available at http://neurosurgery.dergisi.org/submit/Copyright_transfer_form.pdf. Choose your manuscript type and click continue.
2. Add names of institutions of all authors. If one or more author has affiliation with more institutions, specify it in the title page. Then click continue.
3. Write last name and first name of all authors. Add their institution numbers, e-mails and ORCID numbers. Standard page appears with spaces enough for 8 author names. If your paper has more authors, please fill all the first 8 authors names and affiliations then click add author. Without filling all required fields, you cannot add more authors. Do not use abbreviations in the author names. Then click continue.
4. Write the title of the manuscript. If the title contains special characters use the left below table. You can copy-paste the title from your title page. Then click continue.
5. Write the abstract of your manuscript to the field. Abstracts should be structured including Aim, Material and Methods, Results and Conclusion. **Abstracts should not exceed 300 words. There is no need of Turkish abstract.** Then click continue.
6. Write the keywords separated by commas. Please use keywords from <https://meshb.nlm.nih.gov/search>. Then click continue.
7. Click the appropriate answer stating if your manuscript has not been published and / or is not being considered for publication elsewhere or your manuscript was presented in the congress indicated below and was published in abstract form in the proceedings of the congress. Then write your cover letter to the editor to the field. Then click continue.
8. Upload your manuscript files. Be sure your files are main document (manuscript), figure(s), video(s), title page, and table(s). For every file, write the description of your file and click upload button. The names of the files you have submitted should not resemble the names or institutions of the authors. Be sure all your text files are in .doc or .docx format. When you are sure you uploaded all your files click continue.
9. When you complete all the submission process click approve for all the files you want to submit and click **Submit your Manuscript** button.

Revised Submission

Author's comments to the reviewers are required for revised submissions. Authors must address all the reviewer's concerns/suggestions and whether the change was made or not. Authors must also highlight the changes made within the text. Do not track the additions or deletions to the manuscript. If the authors do not want to revise the manuscript within a period of **two months**, the manuscript will be declined.

Ethics, patient anonymity and informed consent:

It is the author's responsibility to ensure that a patient's anonymity is carefully protected and to verify that any experimental investigation with human subjects reported in the manuscript was performed with informed consent and followed all the guidelines for experimental studies with human subjects required by the institution(s) with which all the authors are affiliated. Authors should mask patients' eyes, private parts and remove patients' names from all figures. Editorial board of the Turkish Neurosurgery have the right to demand ethical committee forms or informed consent forms **at any stage of the submission and publication**. All animal experiments should comply with the ARRIVE guidelines <https://www.nc3rs.org.uk/arrive-guidelines>. Also, Editorial board of the Turkish Neurosurgery have the right to withdraw any paper, even it is accepted, if there is any ethical issue.

Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the reported study. The authors should ensure that they have written entirely original works, and if the authors have used the work and/or words of others, that this has been appropriately cited or quoted. Editorial board of the Turkish Neurosurgery have the right to withdraw any paper if there is any plagiarism. All submissions must include disclosure of all relationships that could be viewed as presenting a potential conflict of interest. All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in the disclosure and conflicts of interest section of the main document.

Authorship Change

Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list after submitting the paper is **inappropriate and prohibited**. Authors should **withdraw** their paper if there is a need for authorship change.

Types of Manuscripts

Turkish Neuro-Excursion: The editor will invite experts for these special types of papers which may cover a broad spectrum in various fields of medicine, science, art, history, law as well as any important theme on actuality other than core neurosurgery. The number of words, figures, tables and references are not restricted.

Research (Original Investigation, Clinical and Experimental Studies): The main text should not exceed 4500 words **excluding the** references, tables, and figure legends for original articles, including randomized controlled trials, observational (cohort, case-control or cross-sectional) studies, diagnostic accuracy studies, nonrandomized behavioral and public health intervention trials, experimental animal trials and any other retrospective or prospective clinical or experimental studies. The number of figures, tables, videos and references are not restricted. The specifications for figures and video files are given.

Review Article: All review articles should be systematic reviews and meta-analyses. A systematic review protocol describes the rationale, hypothesis, and planned methods of the review. It should be prepared before a review is started and used as a guide to carry out the review. Turkish Neurosurgery no more accept papers as "Case Report and Review of the Literature". All systematic reviews and meta-analyses **SHOULD COMPLY** with PRISMA guidelines <http://www.prisma-statement.org/>. Systematic reviews and meta analyses **SHOULD INCLUDE** a CONSORT Flow Diagram <http://www.consort-statement.org/consort-statement/flow-diagram>. Any systematic review and meta-analysis without a CONSORT Flow Diagram will be rejected.

Case Report: Turkish Neurosurgery values **demonstrative and unique case reports** with **high quality figures**. A case report should be so clear and easy to understand that the reader could replicate the case in his/her daily practice. Word count must not exceed 1500 (excluding references, tables, and figure legends). Case reports cannot have more than 15 references, and 6 figures or tables. Turkish Neurosurgery **does not accept** papers as "**Case Report and Review of the Literature**" anymore.

Technical Note: Turkish Neurosurgery values **demonstrative technical notes** with **high quality figures**. Technical notes reinforced with high-quality anatomical studies are welcome. A technical note should be so clear and easy to understand that the reader could replicate the technique in the operating room or on cadaveric specimen. The number of words must not exceed 2000, and there should not be more than 20 references. The number of figures and tables are not restricted.

Letter to the Editor: Letters should refer to the title and authors of a recent Turkish Neurosurgery article. The letter should be no longer than 300 words with no more than 3 references. Unpublished data should not be used. Letters to the Editor are sent to the article authors for response. The Editor-in-Chief makes the final decision on whether letters to the editor and the responses are published.

References

The authors are responsible for the accuracy of the references. Key the references (double-spaced) at the end of the manuscript. Cite references in text in alphabetical order within parentheses. Do not link the references to the text. Cite unpublished data, such as papers submitted but not yet accepted for publication or personal communications, in parentheses in the text. **Do not use "et al" in the references**. List all the authors of the reference. Refer to the List of Journals Indexed in Index Medicus for abbreviations of journal names or access the list at "<http://www.nlm.nih.gov/tsd/serials/lji.html>". Also reference styles for Zotero and EndNote are available on the Journal's Home Page.

Sample references are given below:

A. Journal article

Guiot BH, Khoo LT, Fessler RG: A minimally invasive technique for decompression of the lumbar spine. *Turk Neurosurg* 27: 432-438, 2002

B. Additional example

Altınörs N, Kars Z, Arda N, Şenveli E, Türker A, Çınar N: Spinal extradural metastasis of medulloblastoma. *Turk Neurosurg Suppl* 1: 144, 1989

C. Book chapter

Sweitzer S, Arruda J, DeLeo J: The cytokine challenge: Methods for the detection of central cytokines in rodent models of persistent pain. In: Kruger L (ed), *Methods in Pain Research*. Boca Raton, FL: CRC Press, 2001: 109-132

D. Entire book

Atlas SW: *Magnetic Resonance Imaging of the Brain and Spine*. Philadelphia: Lippincott Williams & Wilkins, 2001

E. Example of thesis

Kanpolat Y: Experimental percutaneous access to the trigeminal ganglion and the histopathological evaluation of radiofrequency thermic lesion (Unpublished dissertation), Ankara: Ankara University, 1978:1- 52

F. Software

Epi Info [computer program]. Version 6. Atlanta: Centers for Disease Control and Prevention, 1994

G. Online journals

Friedman SA. Preeclampsia: A review of the role of prostaglandins. *Obstet Gynecol* [serial online]. January 1988;71:22-37. Available from: BRS Information Technologies, McLean, VA. Accessed December 15, 1990

ORIGINAL INVESTIGATIONS

- 1** **Outcome of Primary Central Nervous System Lymphoma Treated with Combined Surgical Resection and High-Dose Methotrexate Chemotherapy: A Single-Institution Retrospective Study**
Qiujuan ZHANG, Da-Wei WANG, Han-Sheng SHU
-
- 6** **Treatment Outcome and Risk Factors Associated with Diffuse Axonal Injury in Patients with Moderate to Severe Head Injury**
Moinay KIM, Suk Kyung HONG, Sang Ryong JEON, Sung Woo ROH, Seungjoo LEE
-
- 16** **Utilizing Deep Convolutional Generative Adversarial Networks for Automatic Segmentation of Gliomas: An Artificial Intelligence Study**
Ebru AYDOGAN DUMAN, Seref SAGIROGLU, Pinar CELTIKCI, Mustafa Umut DEMIREZEN, Alp Ozgun BORCEK, Hakan EMMEZ, Emrah CELTIKCI
-
- 22** **Morphometric Measurement of Lower Lumbar Intervertebral Foramina Based on Digital Three-Dimensional Simulation**
Jian-Hui DAI, Zheng-Xi YU, Xing Li, Yu-Jun WU, Huai-Zhi ZHANG, Xu CHEN, Jian-Hua LV, Hai-Bin LIN
-
- 28** **Operating Room Educational Climate Scale for Surgical Specialty Residents: Scale Development and Validation**
Hulya EYIGOR, Cuneyt Orhan KARA, Mekin SEZIK, Erol GURPINAR
-
- 36** **Variations in the Foramen Transversarium of Cervical Spine and Their Surgical Importance: An Osteological Study in Dried Cervical Vertebrae of North Indian Origin**
Aparba PATRA, Priti CHAUDHARY, Harsimarjit KAUR
-
- 43** **Assessment of Surgical Outcomes in Children and Adult Ischemic Moyamoya Disease and Its Relationship with the Pre-infarction Cerebral Perfusion Status**
Peijiong WANG, Husule CAI, Rutao LUO, Xingju LIU, Dong ZHANG, Yan ZHANG
-
- 52** **Risk Factor Assessment and Outcomes of Intra Procedural Rupture of Intracranial Aneurysm During Endovascular Treatment: A Race Against Time**
Deepak Kumar SINGH, Vipul PATHAK, Kuldeep YADAV
-
- 58** **Diffusion-Weighted Imaging of Brain Metastasis: Correlation of MRI Parameters with Histologic Type**
Esra Meltem KAYAHAN ULU, Bahadır OZTURK, Koksal ATALAY, Ibrahim Baris OKUMUS, Dilek ERDEM, Mustafa Kemal GUL, Ozlem TERZI

- 69** **Effect of Antiplatelet Preparation Before Endovascular Thrombectomy for Cerebral Infarction on Procedural Thromboembolism**
Taek Min NAM, Ji Hwan JANG, Young Zoon KIM, Kyu Hong KIM, Seung Hwan KIM
-
- 76** **Effects of Sevoflurane and Propofol Anesthesia on Cerebral Oxygenation in Patients Undergoing Carotid Endarterectomy**
Zeynep CURA, Bahar OC, Oguzhan ARUN, Mehmet OC, Ipek DUMAN, Ates DUMAN
-
- 83** **Surgical Approach Algorithm in the Treatment of Lumbar and Thoracolumbar Pyogenic Spondylodiscitis**
Turgut AKGUL, Serkan BAYRAM, Murat KORKMAZ, Sahin KARALAR, Fatih DIKICI, Cuneyt SAR
-
- 91** **Evaluation of BMP-2, VEGF, and Vitamin D Receptor Levels in the Ligamentum Flavum of Patients with Lumbar Spinal Stenosis and Disc Herniation**
Bilal ERTUGRUL, Bekir AKGUN, Gokhan ARTAS, Fatih Serhat EROL, Fatih DEMIR
-
- 97** **Vagus Nerve Stimulation in Intractable Epilepsy**
Cem BOLUK, Cigdem OZKARA, Cihan ISLER, Mustafa UZAN
-
- 103** **Observational Retrospective Cohort Two Centred Study on External Ventricular Drain-Related Infections in US and Turkey**
Yazile SAYIN, Bernice Gulay GULEK
-
- 112** **Application of Responsive Neurostimulation as both a Diagnostic Tool for Seizure Localization and a Supplementary Tool for Surgical Management in Patients with Multiple Epileptogenic Foci: A Case Series**
Kamran URGUN, Alvin CHAN, Ronald SAHYOUNI, Kieu TRAN, Frank HSU, Sumeet VADERA
-
- 122** **Cervical Venous Vascular Anatomy for Ventriculoatrial Shunt Applications: Anatomical Study and Surgical Approach Recommendation**
Baris OZONER, Ebubekir AKPINAR, Abuzer GUNGOR, Akin AKAKIN, Turker KILIC
-
- 128** **Morphometric Measurements of Safety Zones and Orientation Angles for Freehand Placement of Revision Screws in Atlas Lateral Mass**
Serkan SIMSEK, Uygur ER, Erek OZTURK, Kazim YIGITKANLI
-
- 135** **Clinical Features, Treatment and Outcome of Childhood Glial Tumors**
Buket KARA, Kubra ERTAN, Pinar KARABAGLI, Hakan KARABAGLI, Guler YAVAS, Ahmet Okay CAGLAYAN, Yavuz KOKSAL

Surgical Treatment in Refractory Epilepsy: Seizure Outcome Results Based on Invasive EEG Monitorization

143

Zahide MAIL GURKAN, Nermin Gorkem SIRIN, Bulent KARA, Gunay GUL, Fulya SENGUL EREN, Betul TEKIN GUVELI, Sibel VELIOGLU, Akin SABANCI, Aydin AYDOSELI, Yavuz ARAS, Nerses BEBEK, Betul BAYKAN, Altay SENCER, Ali Tuncay CANBOLAT, Aysen GOKYIGIT, Ulger AYDOGAN CULHA, Candan GURSES

Facet Median Branch Radiofrequency Thermocoagulation Treatment at Different Temperatures and Durations in Patients with Lumbar Facet Syndrome: A Randomized Controlled Double-Blind Study

149

Esra ERTLAV, Osman Nuri AYDIN, K. Varlik EREL

CASE REPORT

First Case of MELAS Syndrome Presenting with Local Brain Edema Requiring Decompressive Craniectomy

155

Osman YESILBAS, Esma SENGENC, Melike ERSOY OLBAK, Derya BAKO, Oznur Gokce NIZAM, Mehmet Hakan SEYITHANOGLU, Davut PEHLIVAN, Serdar CEYLANER, Dilara ICAGASIOGLU, Kursad AYDIN

Ruptured Proximal Anterior Cerebral Artery Aneurysm Treated with Flow Diverter

160

Andrea GIORGIANNI, Gabriele VINACCI, Edoardo AGOSTI, Stefano MOLINARO, Alberto Vito TERRANA, Federica CASAGRANDE, Francesco Alberto VIZZARI, Fabio BARUZZI, Davide LOCATELLI

Intermediate-Grade Meningeal Melanocytoma in a 19-Month-Old Child with Difficulties in Differential Diagnosis and Management

166

Mustafa SAKAR, Onur ERDOGAN, Suheyla UYAR BOZKURT, Adnan DAGCINAR

LETTER TO EDITOR

Letter to Editor: Blood Urea, Creatinine, and Glucose Levels in Traumatic Brain Injury

171

Rujittika MUNGMUNPUNTIPANTIP, Viroj WIWANITKIT