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Guide for...

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OFP
Osteopathic Family Physician
JOURNAL

2020 CALL FOR PAPERS

Osteopathic Family Physician is the ACOFP's official peer-reviewed journal
The bi-monthly publication features original research, clinical images and articles about preventive medicine, managed care, osteopathic principles and practices, pain management, public health, medical education and practice management.

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- Lupus: Review Article with osteopathic component
- OMT treatments for pediatric conditions: a systematic review
- Decreasing Opioid Use with Mind-Body Therapies
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- Polypharmacy in the Elderly: Evaluating Risk and Deprescribing
- Prostate Disorders Diagnosis and Management review with an osteopathic component
- The impact of climate change on our patients' health and the Family Physician's role

RESEARCH TOPICS

We are seeking original clinical or applied research papers. Original contributions include controlled trials, observational studies, diagnostic test studies, cost-effectiveness studies, and survey-based studies. The OFP will accept basic scientific research only if the work has clear clinical applications. For randomized controlled trials, study flow diagrams must be submitted. For all other types of original contributions, flow diagrams are encouraged. Original contributions should be 3000 words with no more than 50 references and 5 tables or figures. OFP requires you to submit a 250-word abstract, along with four to six keywords.

The content should include the following:

Abstract
Introduction
Methods
Results
Discussion
Conclusions
Acknowledgments

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EDITOR'S MESSAGE

Leadership and Optimism

Ronald Januchowski, DO, FACOFP, Editor, *Osteopathic Family Physician*

We are well into 2020, and spring, along with the ACOFP conference in New Orleans, is right around the corner. The Associate Editor, Paula Gregory, DO, and I will be at the conference to present the Attending Paper of the Year to a few of our distinguished authors of 2019. It is always a privilege to meet physicians that have put time and effort into adding to the Osteopathic medical literature. We hope to network and meet many students, residents, and physicians that will become new authors in the coming years. Meeting these future authors and leaders of the profession provides me with a positive outlook and optimism for the Osteopathic profession.

Speaking of leaders, it was Colin Powell that stated, "Optimism is a force multiplier" and can radiate outward to people and organizations. He didn't suggest that optimism means that one should stoically accept incompetence with learned helplessness, but decide that good change is always possible. I hope to see you in New Orleans and multiply some of this positive enthusiasm.

In this issue of OFP, there are excellent, timely articles. From taking the leadership role in discussing end-of-life care with patients to a thoughtful discussion of public health policy, I feel this issue provides some substantive pieces to the medical literature. Holistic patient care and Osteopathic diagnosis and treatment are integrated into our two review articles. Overall, this issue should provide you with real, actionable items to use in your practice.

Have a great start to your spring, and see you in New Orleans!

Forging Our Osteopathic Future

The ACOFP Foundation recently launched the Forging Our Osteopathic Future Campaign. This is a $2 million fundraising effort to help strengthen the osteopathic medicine profession by ensuring the next generation of osteopathic family physicians are the most highly qualified in the nation. This is the first-ever major fundraising campaign in the organization's history.

What will $2 million fund?

The main goal of the campaign is to fund **300 Initial Certification Grants*** annually for the next five years.

Grant recipients will receive **up to $500 in travel reimbursements and $900 to cover fees** for the AOBFP cognitive and practical exams.

In addition to Initial Certification Grants, campaign funding will allow for enhancement and expansion of:

- Student and Resident Scholarships
- Preceptorship Fund
- Future Leaders Conference

$10,000
7 lives changed

$7,000
5 lives changed

$5,600
4 lives changed

$2,800
2 lives changed

$1,400
1 life changed

Commitments are tax-deductible and can be pledged over a five-year period.

Can my gift really make a difference?

Commitments as small as $0.77/day can change a life. If a contributor pledges $0.77/day for the next five years, that is enough to fund one Initial Certification Grant. $1.44/day can launch the careers of two osteopathic family physicians. No matter the size of your commitment, please know that it can make a demonstrable impact!

*Only residents sitting for both their AOBFP cognitive and practical certification exams for the first time are eligible for grant funding.

For more information, or to make a contribution to the Forging Our Osteopathic Future Campaign, please contact foundation@acofp.org.

acofp EDUCATION & RESEARCH FOUNDATION

FROM THE PRESIDENT'S DESK

Connect and Communicate

Robert C. DeLuca, DO, MBA, FACOFP *dist.*
2019 - 2020 ACOFP President

Historically, the osteopathic profession has met challenges and adversities with renewed passion, increased vigor and a stronger and more viable spirit. When osteopathic physicians were excluded from serving as physicians during the Second World War, the AOA met the challenge head on. As such, by the Korean War, DOs were given the opportunity to work alongside allopathic physicians. Forty years later, an osteopathic physician, Dr. Ronald Blanck, became the Surgeon General of the Army.

In 1960, osteopathic physicians in California could trade their DO designation for an MD degree for $50. It looked like the end of the osteopathic profession; at least in California. However, 200 DOs stood their ground and said, "turn down for what?" They remained osteopathic physicians and continued to fight for full rights. Today, California is home to one of the largest osteopathic communities in the country and two osteopathic colleges.

Many other struggles throughout our history provided the fuel for the flames of osteopathic medicine. These battles fought by those who went before us provided greater opportunities for us to serve the needs of our patients today.

In 2014, a new challenge arose: the single accreditation system. At first, many of us at ACOFP felt this was the beginning of the end of osteopathic education. However, our fears turned to passion and a renewed resolve, that the transition to the ACGME accreditation system would be an avenue to a greater osteopathic profession. The first vital step to success was to ensure a strong and competitive certification pathway. This was not going to be accomplished by simply rewriting an examination, but rather was going to take the cooperative efforts of multiple organizations. With changes in the ACGME policies to accept the AOA certification as equivalent to ABMS, the door was open.

In December 2018, a proposal initiated by the AOBFP in junction with ACOFP announced the Early Entry Initial Certification (EEIC) pathway. This meant that a resident was eligible to sit for an early, shorter examination in February of their third year if they had completed two AOBFP In-Service Exams (ISEs), produced and administered by ACOFP. The AOA approved the plan in June 2019 and the EEIC pathway was launched. In the fall 2019, over 2,700 osteopathic family medicine residents signed up for the AOBFP ISEs; a number that was unimaginable two years before. This program has been successful for one reason; the passion and the cooperation of multiple boards and committees. Those include the AOA, AOBFP, ACOFP and the NBOME, who all came together and hammered out the details. The first EEIC exam will be given next month and the sign-up is going well. *Turn down for what?*

Essential to the success of the AOBFP ISE and EEIC was acceptance by family medicine residency directors and residents. An ACOFP residency hub structure was conceived to help disseminate information. The logistics were engineered by ACOFP President-Elect Dr. Nicole Bixler and carried out by the ACOFP governors. Each governor was assigned a region of the country and a list of family medicine residency directors and residents. They made direct connection with each and promoted the AOBFP ISE and EEIC. *Success by connections and communication.*

Throughout this past year, ACOFP has also been in communication with other specialty colleges. We have formed the Coalition of Osteopathic Specialty Associations (COSA) to grow osteopathic specialty colleges, increase member value and together create the future of osteopathic medicine through providing a forum for cooperation between the specialty colleges. Its effort during the last AOA House of Delegates provided a unified voice on the resolutions and other issues.

ACOFP committees have been revised and revamped to provide increased and improved communication between members, staff and leadership. The Knowledge, Learning and Assessment (KLA) Committee has brought the chairs of all the educational committees together to improve our in-person and online osteopathic learning tools. Our OMT video libraries have been updated and new online learning is planned for the future. The most exciting development is that the OMT Boot Camp is going to be offered at the AAFP FMX convention next fall. *Connect and communicate.*

ACOFP will continue to focus efforts on new and exciting ideas to assist our members in serving their patients. New educational programs are on the horizon. Dr. Bixler is appointing a Task

Force on Annual Convention Innovation to look for new and innovative ways to deliver live education, while our KLA and other programs are identifying ways to enhance our online education for those unable to attend the scientific seminars in person. We have designed a new OMT Boot Camp and proposed this to the AOA and AOBFP to be used as a means for maintaining OCC component four. OMM is still the way we connect and treat.

At the AOA House of Delegates in 2014, after much fierce discussion, the resolution to move forward with the single accreditation system passed. The ACOFP President Dr. Carol Henwood gave a passionate speech and stated that despite our concerns, the ACOFP would work to support this decision. I believe that ACOFP has kept its promise and, along with many other osteopathic groups and organizations, has provided a pathway to a brighter and stronger profession. Opportunities are abounding and we have much work to do. Osteopathic physicians will continue to meet the challenges. *Turn down for what?*

Robert C. DeLuca, DO, FACOFP *dist.*
2019 - 2020 ACOFP President

Rocky Mountain OPTI/Sky Ridge Medical Center
Neuromusculoskeletal Medicine + 1 Residency

Our program was established to enable physicians who have already completed a residency in an approved specialty to spend an extra year enhancing their skills in neuromusculoskeletal medicine and osteopathic manipulative medicine (NMM/OMM). Our goal is to develop highly trained physicians who can act as both clinicians and academicians. Our program places a significant emphasis on the integration of osteopathic manipulative medicine and the principles of primary care sports medicine. Our residents develop their Osteopathic clinical skills by providing inpatient care at Sky Ridge Medical Center and outpatient care at the Rocky Vista Health Center and other associated outpatient clinics.

Our program also includes such rotation choices as neurological surgery, occupational medicine, orthopedic spine surgery, podiatric medicine, primary care sports medicine, neurology, physical medicine and rehabilitation, rheumatology, musculoskeletal radiology, medical acupuncture, family medicine, integrative medicine, functional medicine, hospice and palliative care, internal medicine, obstetrics and gynecology and pediatrics. Academic development occurs through the Rocky Vista University College of Osteopathic Medicine in Parker, Colorado. Successful program completion will allow the physician to apply for the Neuromusculoskeletal Medicine/Osteopathic Manipulative Medicine certification examination.

Kenneth A. Ramey, DO, FACOFP serves as the program director and is a 1994 graduate ofthe Chicago College of Osteopathic Medicine. He is board certified in family medicine/osteopathic manipulative treatment, neuromusculoskeletal medicine/osteopathic manipulative medicine and has a certificate of added qualification in sports medicine. Dr. Ramey is a member of the medical staff at Sky Ridge Medical Center and has served as a team physician at the high school, college and semi-professional levels. He is an Associate Professor of OPP at Rocky Vista University and serves as the Director of the Sports Medicine and Osteopathic Manipulative Medicine Program at the Rocky Vista Health Center.

We have received ACGME Pre-Accreditation and would be honored to consider your application for our program. Please send a current CV, letter of interest and three letters of recommendation (including one from your residency director) to Dr. Ramey at kramey@rvu.edu. Please call Dr. Ramey at (720) 874-2421 if you need additional information.

"The purpose of Osteopathy is to make life a little more comfortable for the patient."

"What are the limits of Osteopathy? No one knows the limits of Osteopathy."

John Martin Littlejohn, DO

LETTER TO THE EDITOR

Pain Management – A Locum Perspective

To the Editor,

Like many of my colleagues, I started getting burnt out a couple years ago. I had a stable job, good staff and I worked for a company I respected. But there was something missing. I no longer had that spark and drive. I knew I needed to make a change. First, I cut down my hours. That helped initially, but a few months later, I needed more. So, much to the surprise of everyone (including myself), I made the decision to quit. I put my house on the market and joined the locum circuit.

My first locum job was in New Zealand. What a glorious place to have a working holiday. Though the pay wasn't ideal, work-life balance was just what I needed. Patients appreciated and respected what I had to offer, paperwork was minimal and I started feeling like the doctor I went to medical school to be. I also made some lifelong friends, traveled around New Zealand in between assignments and felt refreshed.

I moved back to the US after a year where I landed a locum job in rural America. Soon after starting, I realized that one of my primary roles was managing chronic pain patients. I'm trained in family medicine and though I have managed patients with pain my entire career, I never had a substantial pain management load. Seeing 5+ pain patients daily in addition to the more routine family medicine visits, I quickly felt overwhelmed.

So, I had to learn fast. What should I do when a patient comes in for their opioid prescription? The easy option was to prescribe them what they wanted and what they were used to. Not ask too many questions. Not get too involved in the decision making. After all, I'd be leaving in a few months. Why rock the boat?

My conscience wouldn't allow me to do this. Though there were patients that I felt were legitimately on appropriate medications, the majority were taking substantial opioid pain medication for chronic, non-cancer pain. Unfortunately, many of these patients were also on other controlled medications (recreational marijuana, benzodiazepines, sleep agents). To my surprise, they did not seem aware that combining these medications was a concern.

I embarked on an endeavor to help these patients wean down on their medications. I knew I wouldn't get patients completely off their medications in the few months I was there. But I thought if I decreased their daily intake, it would help them know that they can survive with less medication and hopefully, their next provider would have a similar philosophy.

Some patients were open to these changes. Of course, some took to a more comprehensive plan better than others. But ~50% of patients agreed to work with me and did pretty well. Many also allowed me to incorporate Osteopathic Manipulation into their regimen in an attempt to ease their pain.

Another 25% tolerated the changes made but after a month or so, wanted to go back to their previous regimen. Depending on the situation, sometimes I agreed. Other times, I offered alternatives and pushed them to continue working on decreasing their opioid burden. These interactions were tedious and took a lot of effort.

The last 25% staunchly refused to make any changes. There were threats of switching to a different doctor. I was being unfair. "Why change what is working well?" Patients said I was forcing them back to meth. They had to increase their marijuana use to compensate for me taking away their medication. "I'm calling my lawyer." Even threats of suicide. It was very emotional.

For a few patients, their medication needed to be stopped abruptly. The inconsistent urine drug screen, the patient that kept having her medication stolen, an overdose. There was one young man that crushed and injected his oxycodone, ultimately resulting in osteomyelitis of the spine. That was a tricky one. He was legitimately in pain from his spine infection. But I stood firm and required that he travel 1.5 hours to the nearest Pain Management Specialist. They wouldn't fill his medications, in part because he had marijuana in his system. The choices patients make have real consequences.

These patients were foisted on me, a conservative prescriber, for their pain management needs. As I muddled through, I gained confidence. At first, I probably gave in a little easier. But when I started seeing how some of my patients were thriving with less medication, I realized that I should follow my instincts and strive ahead, even with the resistance that was ever present.

Toward the end of my 4.5 month assignment, though few and far between, patients told me they appreciate my care. They appreciated the time I took with them, asking questions no-one had before and coming up with a comprehensive plan. I hope there are others that never got around to thanking me. I think there are.

I learned some valuable lessons about pain management. These were not lessons I wanted to learn. But I did the job I felt compelled to do and learned how to handle a diverse clientele, all in some kind of pain, but with varied agendas. I was better able to determine which patients would be open to alternatives. Which ones would follow my advice. Which ones might do just as well with non-opioid options. Who would be open to OMT. I learned pain management isn't quite as daunting as it had seemed at first.

As a locum, I don't have the luxury of continuity. I don't know if the next provider will have the same philosophy as me. She might agree with some patients and put them right back on the medications they were on before. But I trust she will appreciate my efforts. I've learned that it's OK to be uncomfortable with overmedicated patients while advocating for non-addictive and ultimately safer options. In light of the opioid crisis we find ourselves in, I challenge the next provider to continue bringing healthy balance into the lives of these patients. They deserve it.

Katrine Bengaard, DO
Family Physician
Kotzebue, Alaska

RESEARCH ARTICLE

Barriers to End-of-life Discussions in the Primary Care Setting

Devon S. Boydstun, DO[1]; Shandra Basil, OMS-IV[2]; Jill Porter, DO[3]; Anand Gupta, MBBS, MPH[4]

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KEYWORDS:

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Primary Care

ABSTRACT

Background: The Patient Self Determination Act was passed in 1991 and requires healthcare facilities to present patients with information regarding advanced directives. Since that time, there has been no improvement in the number of patients reported to have had such discussions. Numerous barriers to these discussions exist both on the patient and provider side. This study aims to identify barriers to end of life discussions among providers in the primary care setting.

Methods: The study population included practicing primary care physicians in the OhioHealth system. They were administered an anonymous questionnaire addressing demographic information and questions specific to end of life discussions and what barriers exist.

Results: A majority of primary care physicians reported engaging in end of life discussions with their patients. A majority of physicians cited lack of time as a barrier to having these discussions. There was a statistically significant age difference among primary care physicians who reported they have end of life discussions with their patients and among these physicians there was a statistically significant increase in their level of comfort having these discussions.

Conclusion: Primary care physicians further into their career reported having end of life discussions more frequently and felt more comfortable doing so. Additionally, physicians cite lack of time as the most common barrier to holding end of life discussions.

INTRODUCTION

The Patient Self-Determination Act (PSDA) was passed in 1991 and requires hospitals, skilled nursing facilities, home healthcare agencies, and providers of home healthcare to: *(1)* provide patients with a written summary of patients' healthcare decision-making rights and the facilities' policies with respect to advance directives; *(2)* ask individuals at the time of admission if they have an advance directive; and *(3)* provide education to staff and the community about advance directives.[1] Despite increased advocacy and awareness for advance care planning (ACP), more recent studies were no more successful than studies completed shortly after passage of the PSDA, with success defined as patient completion of ACP documents.[2] Although it is required through the PSDA to "educate patients," there is no requirement in regards to monitoring completion rates, which is likely a contributing factor to low completion rates of advance directives in the US. Could this also be due to the fact that patients opt to not complete them, or due to lack of discussion and understanding?

Multiple studies have shown the existence of certain barriers to having these discussions. From the perspective of physicians, barriers to having these discussions include: lack of time; low health literacy of patients; lack of necessary skills; lack of privacy for discussions; and patients not being "sick enough."[2] From the patient perspective, barriers to completing ACP documents include: deferring to family members or physicians; inconsistency with religious beliefs; too distressing to think about; difficulty completing documents; and planning to do it later.[2] These reasons, in addition to lack of comfort, concern for depression in patients, and lack of confidence in prognosticating abilities, are based mostly on observational studies and pertain to a very specific area

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of medicine (such as chronic kidney disease) instead of medicine and aging in general.[3,4,5] To our knowledge, there has yet to be a detailed study on the perceptions of physicians as to the barriers to holding end-of-life or advanced care planning discussion with their patients. These discussions are imperative to carrying out patient wishes while also being cognizant of the physician commitment to "do no harm" as it relates to futile, invasive treatments. This is supported by the fact that, paradoxically, patients diagnosed with a severe, life-limiting illness who are introduced to palliative care early in their disease course live an average of 25% longer than those who pursue aggressive treatments.[6]

Despite these good outcomes being adequately researched and presented, a majority of end-of-life discussions occurred in the acute setting during a hospitalization.[7] In addition, upon diagnosis with a serious, life-limiting illness such as end-stage renal disease (ESRD) requiring dialysis, 90% of patient's reported that they had not discussed prognosis with their physician.[8] This is staggering as there is an annual mortality rate in these patients of 22%.[8] If this were not evidence enough of the void that has been created surrounding end-of-life discussion, 61% of ESRD patients requiring dialysis wish in hindsight that they would have never started it, the alternative to which would have been death.[9]

Prior studies have shown that patients want their primary care doctor to initiate advance care planning while they are in good health.[10] Moreover, one investigation revealed that patients felt that advanced directive discussions should occur earlier than physicians did across several important domains (i.e., at an earlier age, earlier in the natural history of disease, and earlier in the patient-physician relationship).[11] In addition, most patients felt that it was the physician's responsibility to initiate the discussion about advance care planning.[11] It seems most appropriate that these discussions would occur in the primary care setting between the patient and their physician with whom they have built a good relationship, who knows their medical history, and who plans to see them and care for them in the future. Advanced care planning regarding serious illness is ideally carried out well before such a diagnosis is made. Many studies indicate that by having end-of-life or goals of care discussions, patient's desires are carried out more frequently, healthcare resources are preserved, and patient's surrogate stress decreased.[12,13,14]

The benefits of early advanced care planning and/or end-of-life discussions are plainly clear, however, it is also clear that these discussions are not taking place as often as they should. This study aims to determine exactly why primary care physicians are, by and large, not having these discussions with their patients. In addition, it will characterize by level of experience, gender, age, and practice setting the comfort level of primary care physicians regarding this topic.

Specific Aims

The goal of this study is to describe feedback from primary care physicians (PCPs) regarding end-of-life discussions with patients. This project is designed as an anonymous survey to be administered to physicians from three large healthcare systems in a large Midwestern city, with the following specific aims:

Aim 1. Describe physician-reported comfort level with initiating and engaging in end-of-life discussions with patients. Describe physician-reported barriers to end-of-life discussions.

Aim 2. Describe proportion of patients with whom physician reports having end-of-life discussions, and evaluate if this varies based on physician/practice characteristics, or patient demographics.

METHODS

Study Population

The study population included family medicine residents and attending physicians from 3 large healthcare centers from a large Midwestern city.

Study Variables & Outcomes of Interest

The following data was collected via anonymous survey, by means of project-specific REDCap data collection database and paper surveys. Only the study staff had access to the responses collected in this study. No identifiers were collected.

Study Design

Overall Design

This study was a prospective, anonymous survey to evaluate how end-of-life discussions take place among primary care providers and what barriers exist to holding such discussions. Responses were collected responses from PCPs from central Ohio, including both resident and attending physicians who attended the bi-annual Family Medicine Affiliation Conference, in a large Midwestern city. This affiliation conference occurs twice a year as an educational and networking event.

Eligible physicians received a cover letter and survey regarding end-of-life discussions. Participants were asked to submit responses to participate in this study. Participation was voluntary.

Participants were not excluded on gender, sexual orientation, socioeconomic, racial, or religious identity.

Data Storage and Confidentiality

Only de-identified or non-identifiable data was reported in the study. In addition to collection and storage of data in the HIPAA-compliant, web-based REDCap database and in paper files, resulting data will be stored in electronic format; electronic files will be stored on a password-protected computer and paper files will be stored in a locked office. The data collection and storage processes will follow HIPAA guidelines in accordance with 21 CFR 46.115 (b): to protect both confidentiality and privacy of each participant.

Risks & Benefits, Bias

The only potential risk associated with this study was loss of confidentiality, which was be minimized by collecting anonymous surveys, as well as limiting access to data. Participants did not expect any direct benefit from participating in the study; however,

the outcomes of the study might have identified deficits in continuing medical education (CME), which may prompt CME opportunities. The information from this study will be used to describe PCP feedback on end-of-life discussions with patients, including frequency and barriers.

Statistical Analysis

Demographics and physician/ practice characteristics were described using means, medians and standard deviations for continuous variables and compared using two-sample tests or Wilcoxon Mann Whitney U tests. Discrete variables were described using frequencies and percentages and compared using Chi-square tests or Fisher's exact test between the groups made by the answer to "As a PCP, do you have end-of-life discussions with your patients?" and overall.

Results

The results of this study are in Table 1. There were n=74 PCPs involved in this study. The groups being compared are those that answered yes vs. no on the question, "As a PCP, do you have end-of-life discussions with your patients?" One PCP did not answer this question, so there was a total of n=73 PCPs for this study, with n=8 for No and n=65 for Yes.

Those in the "Yes" Group were statistically significantly older than those in the "No" Group, median (range) of 31(26 to 53) vs. 28(26 to 34), respectively, p=0.0364.

Those in the "Yes" Group were statistically significantly more comfortable initiating and engaging in these conversations compared to those in the "No" Group, 44.6% (29/65) vs. 25% (2/8), p<0.0001.

100% of those in the No Group were still in their residency training.

The most common barrier indicated for not holding end of life discussions in both the "Yes" Group and the "No" Group was lack of time during office visits (50% and 69%, respectively).

DISCUSSION

This study clearly showed that age and time in practice were major factors in holding end of life discussions with patients. This may be attributed to experience, a better knowledge of communication methods, longer relationships with patients, or any combination therein. The most common reason indicated for not holding such discussions, lack of time during office visits, is a trend that is seen nationwide among primary care physicians. The shorter and shorter office visits create an environment that is less conducive to holding serious conversations. Potential ways to overcome these issues include billing based on time and/or having specific visits to address goals of care which is now a billable ICD-10 code.

This study was limited in sample size to those present during the aforementioned conference. Additionally, the sample was representative only to PCPs in one Midwestern city. There may also have been some response and social desirability bias among the answers provided. Lastly, while there was a decent range in years of practice, a large majority of those surveyed were

TABLE 1:

Reactions to methamphetamine[12]

CATEGORY	DATA POINTS
Participant Demographics	1. Age (y) 2. Gender (male, female) 3. Medical degree (MD, DO) 4. Practice setting (urban, sub-urban, rural) 5. Duration of PCP career (resident; less than 5 years, 5 to 10 years, 11 to 20 years, greater than 20 years) 6. Have you ever participated in formal training on how to have end-of-life/advanced directives discussions with patients? (yes/no)
Advanced Directives Feedback	1. As a PCP, do you have end-of-life discussions with your patients? a. No, I do not have end-of-life discussions with my patients. b. Yes, I have end-of-life discussions with some of my patients. c. Yes, I have end-of-life discussions with most of my patients. d. Yes, I have end-of-life discussions with all of my patients. 2. If you have end-of-life discussions with your patients, please describe your level of comfort initiating and engaging in these conversations: a. Not at all comfortable b. Hesitant c. Comfortable d. Very Comfortable e. Not Applicable – I do not have these conversations with my patients. 3. What is the primary barrier that prevents you from initiating or engaging in end-of-life discussions with patients? a. Not enough time during appointments b. Level of comfort c. Knowledge of relevant issues surrounding end-of-life decisions (e.g. advanced directives/living wills, health care power of attorney) d. Concern that it will increase patient anxiety e. Not the responsibility of the PCP f. Other (describe): 4. At what age should patients have advanced directives established? a. All adult patients should discuss and record end-of-life preferences b. Age 35-50 c. Age 51-65 d. Age 66+

Advanced Directives Feedback	5. What health status prompts you to have end-of-life planning discussions with your patients? a. have end-of-life discussions with most or all of my patients, no matter their health status. b. I have end-of-life discussions with my patients who have chronic but manageable disease/health concerns. c. I have end-of-life discussions with my patients who have non-manageable or untreated disease/health concerns. d. I have end-of-life discussions with my patients who have terminal disease. e. Not applicable - I do not have these conversations with my patients. 6. At what age do you most often initiate end-of-life discussions? a. Any adult patient b. Age 35-64 c. Age 65+ d. Not applicable - I do not have these conversations with my patients. 7. What percentage of patients have you had end-of-life discussions? a. Less than 25% b. 26-50% c. 51-75% d. 76-100%

resident physicians or very early in their career. Strengths of this study included surveying physicians across a broad spectrum of experience, ability to indicate personal barriers to end of life discussions, and assessing if there was a difference between practice settings.

Additional research is needed in this area to better identify broader trends in barriers to holding end of life discussions as well as to determine what standardized methods may be employed in encourage holding these discussions more often.

CONCLUSION

While a majority of primary care physicians report holding end of life discussions with their patients, a review of the literature suggests most patients end up having these discussions in the acute setting while hospitalized. Our evidence supports the hypothesis that older physicians who are further along in their career have a higher degree of comfort having end of life discussions with their patients. This is possibly due to their relative advanced experience level but also may be a measure of how long they have known their patients. While multiple barriers exist to having these discussions, it appears that lack of time during office visits is the most common problem indicated. Further studies are necessary to decipher why most end of life discussions are happening after an acute event rather than in a controlled office setting by the primary care physician. Through this additional research, primary care physicians could better identify broader trends in barriers to holding end of life discussions as well as to determine what standardized methods may be employed in encourage holding these discussions more often.

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REVIEW ARTICLE

Non-Allergic Rhinitis with Osteopathic Treatment Techniques

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KEYWORDS:

Non-Allergic Rhinitis

Osteopathic Manipulative Medicine

ABSTRACT: Rhinitis is generally classified as allergic or non-allergic and is differentiated from conditions that mimic symptoms of rhinitis. This article reviews the non-allergic forms of rhinitis highlighting signs, symptoms and diagnosis. An in-depth overview of osteopathic treatment options for the head and neck are outlined to assist osteopathic family physicians in providing symptom relief to their non-allergic rhinitis patients.

INTRODUCTION

Non-allergic rhinitis (NAR) is a heterogeneous condition rather than a specific disease. It is characterized by periodic or perennial symptoms of rhinitis that are not a result of IgE-dependent events or infectious in origin. These include non-allergic rhinopathy, infectious rhinitis, and rhinitis caused by foods or alcohol.[1] NAR disproportionately affects women; who tend to suffer from recurring headaches and recurrent sinusitis as well.[2] NAR affects about 7% of the U.S. population.[3]

The extensive mucosal area of the nose provides a surface for warming and humidification of inspired air and removal of air pollutants. Physical and chemical stimuli can elicit specific nasal sensations, including olfaction, warming or cooling, irritation and nasal pruritus. These stimuli can trigger nasal secretion or and obstruction.

NAR is defined by symptoms where there is some combination of sneezing, rhinorrhea, nasal congestion, and postnasal drainage in the absence of a specific etiology. Non-allergic rhinopathy replaced the term vasomotor rhinitis (VMR) since the term VMR implies the involvement of nasal vascular and glandular abnormalities contributing to inflammation and current data suggest that NAR is due to neurosensory abnormalities with minimal inflammation. NAR is a heterogeneous disorder that includes anatomic abnormalities, endogenous atopy, nociceptive nerve dysfunction and autonomic dysfunction[4] and is probably due to neurosensory abnormalities not inflammation.[5] NAR should be differentiated from other causes of rhinitis that include infectious and allergic subtypes, among other causes.

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DIFFERENTIAL DIAGNOSIS

Infectious rhinitis is an acute process generally secondary to viral infections or secondary bacterial infection. Symptoms include nasal congestion, mucopurulent nasal discharge, pain and pressure, headache, olfactory disturbance, postnasal drainage, and cough. Viral infections account for as many as 98% of acute infectious rhinitis and the majority of rhinitis symptoms in children.[6] Conditions associated with NAR include acute and chronic sinusitis, headaches, asthma, chronic cough, conjunctivitis, otitis media with or without effusion, nasal polyps, hearing impairment, obstructive sleep apnea, and other sleep disturbances.

Allergic rhinitis is an IgE-mediated inflammatory process of the nasal mucosa prompted by environmental allergens that are often seasonal.[7] These patients tend to have more sneezing and itchy eyes compared to patients with NAR, and asthma is more common.[2]

SIGNS AND SYMPTOMS AND DIAGNOSIS

The diagnosis of NAR is made on clinical grounds and starts with a careful history and physical. Some authors suggest skin testing or in vitro testing for seasonal and perennial aeroallergens to rule out an allergic component.[8] Start by identifying the pattern, seasonality, related symptoms response to medications and an environmental history. Primary symptoms of NAR are nasal congestion and rhinorrhea. Secondary symptoms might include throat clearing, cough, ear pressure or popping, sneezing, reduced ability to smell and to detect odors (hyposmia) and facial pressure or headache. Symptoms may be continuous or intermittent and may be influenced by one or more precipitating factors.[9]

Physical examination for NAR is more variable than in allergic rhinitis and therefore is of limited value in differentiating rhinitis subtypes. The nasal mucosa is normal or erythematous, often with evidence of prominent postnasal drip with cobblestoning or may appear red and beefy with scant mucus.[10] Note that if the

patient is asymptomatic, the physical exam may be normal. Short- and long-term complications decreased quality of life and include chronic cough, poor cognitive functioning, daytime fatigue, reduced productivity, and absenteeism.

TREATMENT

Treatment is symptomatic. First-line treatment should include avoidance of triggers when practicable. There is evidence that topical saline is beneficial in the treatment of the symptoms when used alone or as an adjunctive treatment.[6] Other treatments include intranasal steroids, intranasal antihistamines, a combination of both and oral decongestants. Oral second-generation antihistamines are minimally effective. Though first-generation oral antihistamines may haves some benefit due to anticholinergic activity, use of these medications may impair cognitive function and in worst-case scenarios lead to an increase in motor vehicle crashes.[11]

Intranasal ipratropium bromide is helpful when rhinorrhea is the predominant symptom. It is more effective when used in combination with an intranasal cortico¬steroid than either drug alone. The main side effect is dryness of the nasal mucosa.[6]

OSTEOPATHIC TECHNIQUES FOR THE HEAD AND NECK

Restrictions in cranial movement can lead to altered subtle mobility of the parietal and temporal bones interfering with the proper articulation of the cranial bones and the primary respiratory mechanism. Restriction in the sphenoid and occiput relationship can lead to different movements of the frontal, parietal, temporal bones, which can influence patients' ear, nose and throat complaints.

If the physician is familiar with basic cranial osteopathic manipulative technique (OMT) the CV4 compression technique and frontal sinus lift can be utilized to normalize cranial motion. Most Osteopathic physicians that practice in-depth cranial OMT take courses beyond what is the standard curriculum in medical school that are not in the scope of this review. The approach described below includes easily mastered OMT techniques that provide symptom relief and often can be taught in the office to the patient or family member to utilize at home.

TABLE 1:

Treatment summary

TREATMENT	LEVEL OF EVIDENCE	REFERENCES
Avoidance of known triggers	Level C	6
Nasal saline	Level A	6
Oral antihistamines	Level C	12
Intranasal corticosteroids	Level A	12,13
Intranasal antihistamines	Level A	6
Intranasal anticholinergics	Level A	6
Oral decongestants	Level A	6

The clinician's approach could include releasing the thoracic inlet, hyoid, cricoid and thyroid cartilage release, cervical chain drainage techniques, submandibular release, mandibular drainage/ Galbreath technique, auricular drainage technique, alternating nasal pressure, trigeminal nerve decongestion and effleurage of the maxilla and frontal sinuses. Correction of cervical somatic dysfunction and treatment of parasympathetic and sympathetic influences can also be addressed. This suggested order allows for optimal lymphatic flow, but a busy family physician most commonly will adapt and utilize the techniques they feel are most efficacious and that can be performed in the constraints of the standard office visit.

Release of Thoracic Inlet

The physician decompresses the thoracic inlet by correcting the asymmetry of the soft tissues and fascia. This is done by screening the thoracic inlet in all three planes of motion which are bounded by the first rib, first thoracic vertebra, and the clavicles. The physician palpates the soft tissues and boney landmarks to ascertain the freedom and restrictions. The physician then applies an indirect or direct force to normalize motion and symmetry. This lymphatic technique allows for freer movement of lymphatic drainage from the head and regions that are subsequently treated. Treatment of restrictions of the first rib may also be considered.

FIGURE 1:

Release of the thoracic inlet

Hyoid, Cricoid and Thyroid Cartilage Release

The physician gently articulates the cartilage of the hyoid bone, cricoid cartilage and thyroid cartilage while stabilizing the head gently with the opposite hand at the forehead or occiput.

Cervical Chain Drainage

The physician downwardly displaces the sternocleidomastoid muscle and uses a "milking" motion along the span of the muscle from a caudad to cephalad direction to facilitate cervical lymphatic drainage.

Submandibular Release

The physician uses the tips of the fingers to assess the ease of motion and symmetry of the submandibular fascia.

FIGURE 2:

Submandibular release

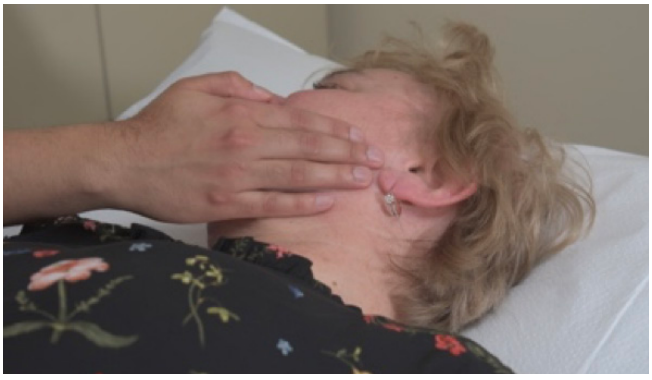
Mandibular Drainage/Galbreath maneuver

The physician places one hand to stabilize the head and then uses the fingers and hypothenar eminence to gently ease the mandible forward and toward the midline in a slow and rhythmic motion.

This technique can help relieve the dysfunction of the eustachian tubes and is helpful for lymphatic congestion in the ear, nose, throat and submandibular region. Care must be taken in patients with temporomandibular pain and dysfunction to not stress the joint or cartilage.

FIGURE 3:

Mandibular drainage/Galbreath maneuver



Auricular Drainage

The outer ear is stabilized and secured between the third and fourth digits of the physician's dominant hand while the other hand stabilizes the head. The hand applied to the external ear then makes gentle circles in clockwise direction ending with a gentle tug on the tragus. This technique can be taught to patients and family members.

FIGURE 4:

Teaching patient auricular drainage

Alternation Nasal Pressure

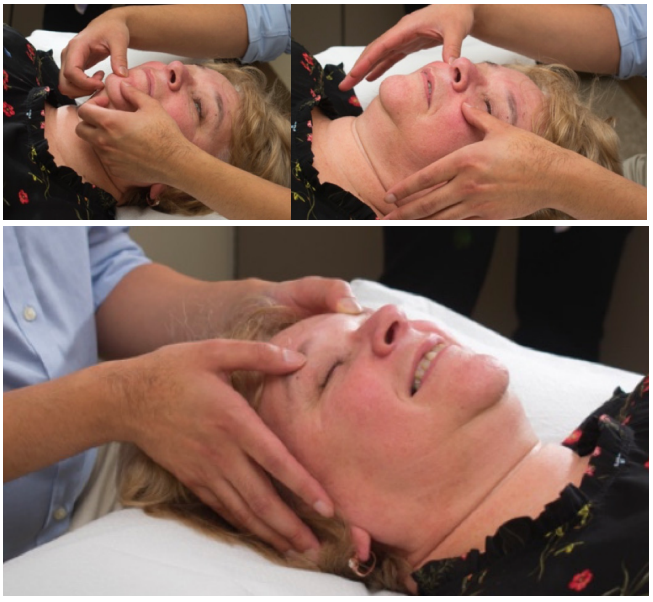
The physician or patient presses in a diagonal fashion downward on the ethmoid sinus in a rhythmic pattern to facilitate lymphatic drainage through the sinus.

Trigeminal Nerve Decompression at the supra, infra and mental foramina

The physician or patient uses the pads of the fingers to apply gently rotary pressure to decompress the trigeminal nerve at the areas of exit of the branches of cranial nerve V in the V1, V2 and V3 distribution. These foramina are easily palpated and can be shown to the patient or family member for home treatment.

FIGURE 5:

Trigeminal nerve decompression



Maxillary and Frontal Effleurage

The physician gently strokes the patient's skin over the maxillary and frontal sinuses. To treat the maxilla, the motion is medial to lateral, beginning at the infraorbital foramina and moving toward the zygoma. In the frontal area the treatment begins medial to the eyebrow and moves laterally.

FIGURE 6:

Teaching patient auricular drainage

FIGURE 7:

Maxillary technique

Cervical Somatic Dysfunction

Correcting cervical dysfunctions can aid with lymphatic drainage from the head to the major lymphatic channels. Treatment of cervical dysfunction can also decrease muscle tone in the cervical spine leading to less headaches and congestion.

Sympathetic and Parasympathetic Influences

Treatment in the upper thoracic region T1 -T5 normalizes the sympathetic output to the head and neck region. Treating the Sphenopalatine ganglion with short intermittent pressure inside the mouth with a gloved finger can enhance parasympathetic activity and encourage thin watery secretions facilitating sinus and nasal drainage. Sub-occipital release is also useful at the occipitoalatlantal articulation influencing the vagus nerve. Those experienced in other in-depth cranial techniques can apply these to affect the parasympathetic influence in the head region.

RECOMMENDED RESOURCES

Three excellent textbooks for the novice or experienced family physician to review Osteopathic manual medicine techniques are the 5 Minute OMM Consult by Millicent Channell, DO and David C. Mason DO, Atlas of Osteopathic Techniques by Alexander S. Nicholas, DO and Evan A. Nicholas, DO and Somatic Dysfunction in Osteopathic Family Medicine by Kenneth Nelson, DO.[14,15,16] The techniques described in this article can be furthered explored in these resources. The latter two resources have accompanying video content.

CONCLUSION

NAR is a common complaint that includes symptoms including some erythema of the nares, sinus drainage, sinus pressure, and sinus headaches. It is treated with nasal saline irrigation, nasal antihistamines, nasal anticholinergics, nasal steroids, antihistamines, and avoidance of triggers. Allergy testing is recommended to rule out allergic causes in some cases. Osteopathic treatment can be used to treat not only symptoms that may be seen with this condition but also to eliminate the predisposing dysfunctions of the head and neck which can contribute to worsening symptoms in patients.

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CALENDAR OF EVENTS

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New Orleans, Louisiana
www.acofp.org

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ACOFP '20 Annual Convention and Scientific Seminars
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MARCH 23 – 25, 2020
Indiana 123rd Annual Spring Update
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APRIL 1 – 5, 2020
AOMA 98th Annual Convention
Scotsdale, Arizona
www.az-osteo.org

APRIL 4, 2020
ACOFP Annual Meeting & Social
Scotsdale, Arizona

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Norman, Oklahoma
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Maine ACOFP
Rockport, Maine
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REVIEW ARTICLE

Primary Care Recognition and Treatment of Methamphetamine Use Disorder

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KEYWORDS:
Addiction
DAST
Methamphetamine
Psychostimulant
Stimulant

ABSTRACT: Methamphetamine addiction remains one of the most common substance use disorders encountered by physicians and is often unrecognized in the current opioid epidemic. Methamphetamine remains widely available in the United States despite laws designed to limit illicit production. Physical signs of methamphetamine abuse are not always recognized in the primary care setting. The utilization of the Drug Abuse Screening Test (DAST) has helped in identification of drug abusers in this setting. The mainstay of treatment remains cognitive behavioral therapy. Though various medications have been tried, none have gained FDA approval because of lack of proven efficacy. The most promising treatment modality on the horizon appears to be immunotherapy. Treatment, while not necessarily efficacious in the long term, is widely available today.

Methamphetamine is the most sought-after psychostimulant drug worldwide and most common illicit drug abused, aside from cannabis.[1,2] Methamphetamine abuse is at epidemic proportions and is now considered a major global health crisis. In the United States, methamphetamine abuse initially grew out of the overuse and overprescribing of amphetamines for depression and weight loss, especially from 1945-1971. In 1971 amphetamine products were made Schedule II by the Bureau of Narcotics and Dangerous Drugs, forerunner to the Drug Enforcement Administration.[3] In the 1970s, methamphetamine started to be mass-produced as an illicit drug from methylamine. Manufacture from pseudoephedrine and ephedrine using the Birch Reduction Method can also be done.[2] The ability to manufacture methamphetamine cheaply and efficiently has led to unprecedented availability of this drug on an international basis, predominately in the United States, South Africa, and Australia.[2] Of the drugs seized by United States law enforcement agencies in 2017, methamphetamine was the most common to be identified through laboratory testing.[4]

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The listing of amphetamines as Schedule II led to limitations on legal production by pharmaceutical companies.[3] In 1971 the legal production limit was set at 15000kg, which is approximately 3 billion 10mg amphetamine sulfate tablets and 1 billion 10mg methamphetamine hydrochloride tablets. For 1972 the legal production limit was changed to one fifth of that in 1971, approximately 3000kg.[3] Local production of methamphetamine has decreased due to laws in the United States that mandate logging of pseudoephedrine and ephedrine purchases.[2,3] Unfortunately international methamphetamine production has increased dramatically and drug arrests at the southwestern border of the United States have increased by 157% since 2016.[5]

Methamphetamine has the common street names of: Meth, Crystal Meth, Crystal, Speed, Crank, Ice, Glass, Chalk, Redneck Cocaine, Yellow Powder, Yellow Barn, Tina, Tick-Tick, Spoosh, Scootie, Tweak, Uppers, Christina, Go Fast, Cookies, Cotton Candy, Dunk, Gak, Go-Go Juice, No Doze, White Cross, Pookie, Rocket Fuel, Scooby Snax, Wash, Trash, and Garbage.[6,7] Smokable methamphetamine also has several unique street names: Hot Ice, Super Ice, L.A. Glass, L.A. ICE, Quartz, Batu, Hanyak, and Hiropon.[6] Knowledge of street names pertaining to drugs aides in identifying drug use, however these names frequently change.[7]

The clandestine manufacturing of methamphetamine can result in explosions from the highly volatile chemicals used in production. Volatile materials in the production process can include acetone,

ethyl alcohol, red phosphorus, hypophosphorous acid, and lithium metal.8 Hospitalizations for methamphetamine toxicity within the United States have increased dramatically over the past decade and accounted for $2.17 billion in hospital costs in 2015.[9] Materials utilized in the manufacture of methamphetamine pose their own unique health hazards. Exposure can lead to pulmonary edema, chemical pneumonitis, disorientation, burns, and death.[8]

The challenge primary care physicians face is that many of the physical and psychological manifestations of methamphetamine abuse are not always specific. These can include headaches, mood swings, and sleeplessness.[10] As a result, users are often unrecognized, misdiagnosed, and mismanaged. Primary care physicians have failed to diagnose substance use disorder in approximately 43% of patients.[10] Methamphetamine can be taken orally, snorted, smoked, injected, or placed in the rectum. Smoking is the most common form of administration by users.[11]

The high methamphetamine users experience is caused by dopamine, norepinephrine, and serotonin release. Effects include a sense of euphoria, increased alertness, increased energy, increased libido, as well as increased sexual pleasure.[11] Advertisements for amphetamines in the past claimed to restore cheerfulness, mental alertness, optimism, and manage obesity.[3] Due to many of the effects, methamphetamine use can be associated with high-risk sexual behaviors.[11] *Table 1* lists additional reactions associated to methamphetamine use.[12]

TABLE 1:

Reactions to methamphetamine[12]

Psychosis	**Headache**
Mania	**Weight Loss**
Aggressive Behavior	**Emotional Lability**
Myocardial Infarction Stroke	**Dizziness**
Hypertension	**Diarrhea**
Cardiomegaly	**Tachycardia**
Seizures	**Constipation**
Priapism	**Libido Changes**
Peripheral Vasculopathy	**Motor Tic Exacerbation**
Raynaud Phenomenon	**Phonic Tic Exacerbation**
Growth Suppression	**Impotence**
Rhabdomyolysis	**Palpitations**
Anorexia	**Visual Disturbance**
Xerostomia	**Restlessness**
Insomnia	**Stroke**

PHYSICAL AND PSYCHOLOGICAL MANIFESTATIONS

The physical manifestations of acute methamphetamine can include tachycardia, elevated blood pressure, elevated respiratory rate, mydriasis, perspiration, hyperthermia, muscle fatigue, muscle cramping, as well as nausea and vomiting.[13] Oral examination of methamphetamine addicted patients is characterized by what is called "Meth Mouth" which consists of a combination of xerostomia, dental caries, discoloration of dentition, decay of dentition, missing dentition, as well as gum disease.[14] Less common but more serious symptoms include seizures, myocardial infarction, and even a psychosis-like state which mimics schizophrenia.[15] Chronic methamphetamine use changes the dopamine system of the brain and leads to cognitive decline, elevated anxiety, depression, irritability, aggressiveness, auditory hallucinations, motor skill impairment, confusion, as well as paranoia.[13]

The long-term psychological sequelae of methamphetamine abuse can lead to chronic anxiety, depression, schizophrenia, and bipolar disorder.[16] Methamphetamine abusers can also present with comorbid psychiatric illness.[17] The prolonged use of higher doses of methamphetamine, greater than 50mg, can lead to psychosis and has been associated with Parkinson's disease.[16] Neurotoxicity and neurocognitive effects occur from actions involving dopamine, norepinephrine, and serotonin. Mechanisms responsible for this may include excessive dopamine levels at the synaptic cleft as well as cytsol, pro-apoptotic changes, oxidative stresses, and neuroinflammation.[13] Even after cessation, neurologic symptoms can persist for several months to years.[16] Some of these symptoms improve following prolonged cessation from methamphetamine.[13]

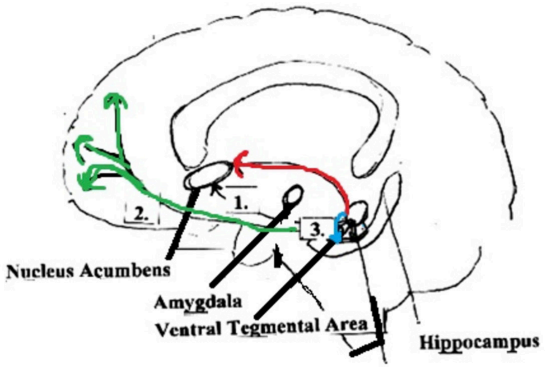
PHARMACOLOGY

Methamphetamine is an indirect agonist to the receptors for dopamine, norepinephrine, and serotonin.[16] As methamphetamine is structurally similar to monoamines, it is able to bind with the dopamine transporter (DAT), norepinephrine transporter (NET), serotonin transporter (SERT), and vesicular monoamine transpoert-2 (VMAT-2).[13] This results in a release of dopamine, norepinephrine, and serotonin into synapses, while methamphetamine can also inhibit monoamine oxidase.[16] The dopaminergic pathways affected include the mesolimbic, mesocortical, and nigrostriatal pathways of the central nervous system.[16] Additionally memory impairment can result from effects at the hippocampus, which is the site of memory formation.[16,18] Increased dopamine and norepinephrine affects cognition, executive function, decision making, as well as reward processing.[19]

Chronic repeated use of methamphetamine can lead to addiction. Chronic users and addicts may have difficulty achieving pleasure outside of consuming methamphetamine, which fuels further abuse of methamphetamine.[20] Sex, food, and other normal life activities fail to come close to methamphetamine's euphoria.[15,21] Intranasal administration takes approximately 5 minutes to reach euphoric peak, while oral administration takes approximately 20 minutes. The euphoric effects which also include elevated mental acuity, elevated mood, as well as social and sexual disinhibition, last for approximately 8-12 hours.[13]

FIGURE 1:

Mesolimbic and mesocortical pathways affected by methamphetamine[22]



1. Projections from the Ventral Tegmental Area to Nucleus Acumbens produce pleasure (Mesolimbic System).
2. Projections also extend from the Ventral Tegmental Area to the Prefrontal Cortex (Mesocortical System).
3. Projections from the Ventral Tegmental Area to the hippocampus are involved in the brain's formation of memory. When these get activated by the dopamine surge from methamphetamine, the memory of the intense pleasure is formed.

SCREENING

The utilization of the Drug Abuse Screening Test (DAST) has helped in identification of drug abusers in the primary care setting. The DAST consists of ten items and helps screen for drug use disorders. The ten items from a DAST will result in a score of zero to ten. A score above two indicates a positive screening test.[23] The DAST was designed for clinical screening as well as for research purposes.[24] Questions are answered in the yes/no format, and are as follows:[25]

1. Have you used drugs other than those required for medical reasons?
2. Do you abuse more than one drug at a time?
3. Are you unable to stop abusing drugs when you want to?
4. Have you ever had blackouts or flashbacks as a result of drug use?
5. Do you feel bad or guilty about your drug use?
6. Does your spouse (or parents) ever complain about your involvement with drugs?
7. Have you neglected your family because of your use of drugs?
8. Have you engaged in illegal activities in order to obtain drugs?
9. Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?
10. Have you had medical problems as a result of your drug use (e.g. memory loss, hepatitis, convulsions, bleeding)?

The DAST takes approximately five minutes or less to be answered and can be scored rapidly.[26] Sensitivity range is 65-90%, while specificity range is 68-98%. Negative predictive value ranges from 93-99%, while positive predictive value ranges from 35-90%.[26]

TREATMENT

Even when abuse is recognized, there are a limited number of treatment options available. Cognitive Behavioral Therapy (CBT) remains the mainstay of therapy as there are currently no approved medications for methamphetamine abuse.[27,28] Combining psychosocial intervention, such as CBT, with suitable pharmacotherapy will likely result in improved patient outcomes.[27] Many medications have been used off label, such as Gabapentin, Anti-psychotics, Tri-cyclics, SSRI's, and SNRI's, but none have demonstrated any efficacy in the reduction of use or cravings.[29] Stimulant medications such as Adderall and Ritalin have been studied as well, but results are inconclusive and do not demonstrate a reduction in relapse rate, but do show a reduction in cravings in two studies.[21,29] One small study reported that N-acetylcysteamine demonstrated a reduction in cravings, but had no effect on relapse.[30] Modafinil (Provigil) weakly binds to DAT (presynaptic dopamine transporter), modulates hypocretin, histamine, GABA, and glutamate receptors and may play a role in medical treatment of methamphetamine addiction.[31] Most pharmaceutical studies that have been conducted to date have very small numbers and lack the power to be conclusive in their findings.

CBT has shown efficacy when utilized as a monotherapy as well as in combination therapy.[32] CBT as a psychosocial intervention has proven effective in reducing stimulant use by patients.[29] CBT utilizes multiple strategies that include: motivational interventions, contingency management, as well as relapse prevention.[32] When initiating CBT, it is important to consider the patient's motivation for seeking treatment as well as the probability that the patient will adhere to the recommended treatment regimen. Regarding contingency management, this is utilized in an effort to thwart the reinforcing properties of illicit drug use.[32,33] Contingency management achieves this by non-drug reinforcers, essentially rewards/prizes, for confirmed prolonged periods of abstinence from substance abuse.[32] Contingency management was first used with alcohol-abuse disorders, but is now utilized with all sorts of substance abuse disorders.[33] As abstinence duration increases, level of reward may also increase. The limitation to contingency management is however the limitation of available funding at programs that utilize it as part of their CBT.[32] Relapse prevention focuses on what has triggered the utilization of drugs in the past, and how to help the patient refrain from relapse when encountering these triggers. Identification of triggers, which may include the company of other drug users, alcohol, or settings where the patient has previously used, is a key element of relapse prevention.[32] Support groups can also be used as a form of supplemental treatment to prevent relapse of drug use. These groups do not typically have a formal curriculum, and topics of discussion are determined by the group members.[34]

One study in particular has evaluated CBT vs contingency management alone vs CBT with Contingency Management.[35] Each

group started with approximately 60 patients, with approximately 75% completing treatment in each group. Post-treatment stimulant use was assessed by utilization of urine samples and self-reported stimulant use during follow up at 17 weeks, 26 weeks, as well as 52 weeks after treatment completion. Results indicated that all three groups showed 67-79% stimulant free urine samples at these time points.[35] Self-reported stimulant use results indicated that pre-treatment mean days of use for each group was 9-10 days, and post-treatment 2-5 days at the same follow up time points.[35] The self-reported stimulant use by the patients in this study was for use within the 30 days prior to each follow up.[35]

The National Institute of Drug Abuse has identified research in methamphetamine abuse as a priority. Currently research is underway to determine the efficacy of stimulating monoclonal antibodies to methamphetamine in order to create a complex that cannot easily cross the blood brain barrier.[36] Concentrations of methamphetamine are typically greater in the brain as compared to serum concentrations, however with monoclonal antibodies the serum concentration is greater. If concentrations are greater outside the brain, this leads to a reduction in noticeable effects of methamphetamine.[36] Monoclonal antibodies with the ability to rapidly reverse methamphetamine effects could prove useful for overdose treatment. Monoclonal antibodies mAb4G9 and mAb7F9 have both shown ability towards rapid reduction in methamphetamine effects.[36]

Another drug undergoing studies for methamphetamine abuse is Ibudilast, a non-selective phosphodiesterase (PDE) inhibitor and modulator of central nervous system glial cell activation.[27] Ibudilast targets macrophage inhibitory factor (MIF), PDE-4, PDE-10, as well as having some activity with PDE-3, and PDE-11.[27] Glial cells may be involved in the rewarding properties of methamphetamine and other drugs of abuse, however glial cells also secrete pro-inflammatory cytokines which can be associated with cognitive dysfunction as well as other symptoms of neurotoxicity and neurodegenerative diseases.[27] Suppression of methamphetamine glial cell activation, and the associated pro-inflammatory cytokines, presents a treatment option for methamphetamine abuse.[27] Ibudilast has been shown to inhibit methamphetamine seeking in rats, and has already been in use for treatment of asthma, allergies, and post stroke dizziness in Asia since 1989. There has been an adequate safety record at doses of 30mg or less per day.[27] Phase 1 and phase 2a clinical trials, at doses above 30mg/day, have been conducted in the United States and Australia without significant adverse event[27]

CONCLUSION

In 2017 there were 70,237 drug overdose deaths in the Unites States, with 23,139 of these deaths involving psychostimulants.[4] Deaths attributable to psychostimulant abuse are increasing because of the availability of methamphetamine. Of the drug products seized by law enforcement in 2017, methamphetamine was the most commonly identified through laboratory testing.[4] Unfortunately, there are no currently approved medications for treatment of methamphetamine abuse.[27,28] Although medications, such as Gabapentin, Anti-psychotics, Tri-cyclics, SSRI's, and SNRI's, have been used off label, none have demonstrated efficacy in reduction of use or cravings.[29] Research with neuro-immune modulators, Provigil, and monoclonal antibodies to methamphetamine may show some promise.[27,31,36] CBT as a monotherapy as well as in combination therapy has shown efficacy in treatment of methamphetamine abuse.[32] Combining psychosocial intervention, such as CBT, with suitable pharmacotherapy will likely result in improved patient outcomes.[27] *Table 2* provides several additional resources for clinicians and patients to help obtain information as well as assistance with addiction.[7,28,37,38,39,40]

TABLE 2:[7,28,37,38,39,40]

Places for methamphetamine addicted individuals to seek help

samhsa.gov	**Online treatment locator, searchable by zip code.**
asam.org	**"find a doctor" in resources section, also searchable by country.**
na.org	**Narcotics Anonymous Website, worldwide meeting finder available on site. Also available as phone app for iOS and Android.**
luxury.rehabs.com	**Treatment center website, many resources for assistance with addictions. 24/7 Phone# 1-866-308-1949.**
drugabuse.gov	**Patient & Families section with many resources for public use. Other resources for educators, researchers, & health professionals**
americanaddictioncenters.org	**American Addiction Centers website, many resources for assistance with addictions. 24/7 Phone# 1-888-987-1784.**

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CLINICAL IMAGE

Seizures in an Immunocompromised Patient

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A 37-year-old female with a past medical history of human immunodeficiency virus (HIV) presents to the emergency department with tonic-clonic seizures. The patient experienced two tonic-clonic seizures at home earlier that day and was brought to urgent care by family members. She was evaluated by urgent care and was then transferred to the emergency department, where she underwent a brain computed tomography (CT) without contrast and magnetic resonance imaging (MRI) with and without contrast *(Figures 1 and 2)*. The patient stated she had a cough for the past week that was productive and clear in nature. Other than an abrasion to her bottom lip, she suffered no injuries. She has a prior history of seizures but was not taking any anti-epileptic medications. The patient was diagnosed with HIV approximately ten years prior to this presentation and was temporarily on highly active antiretroviral therapy (HAART), but then became non-adherent to the regimen. She smokes a half a pack of cigarettes per day and is a "regular" drinker. She would not disclose the exact quantity of her alcohol consumption. The patient had no other significant medical history. Her surgical history consisted of a caesarian delivery and tubal ligation. Her family history is significant for hypertension. She denied headache, dizziness, fever, chills, neck stiffness, numbness, gait disturbance, weakness, vision changes, abdominal pain, chest pain, and labored breathing.

FIGURE 1:

Axial T2-weighted MRI of the brain depicting T2 hyperintensities involving the subcortical U fibers most notably at the right occipital lobe and to a lesser extent the left occipital lobe and the left temporal lobe with associated atrophy (yellow arrows).

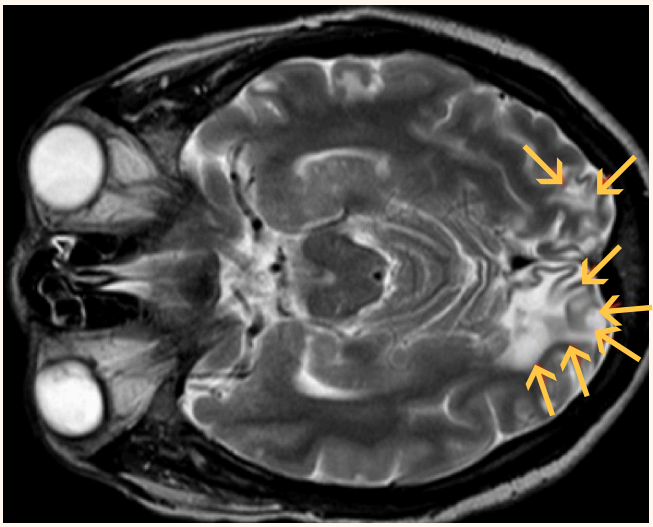
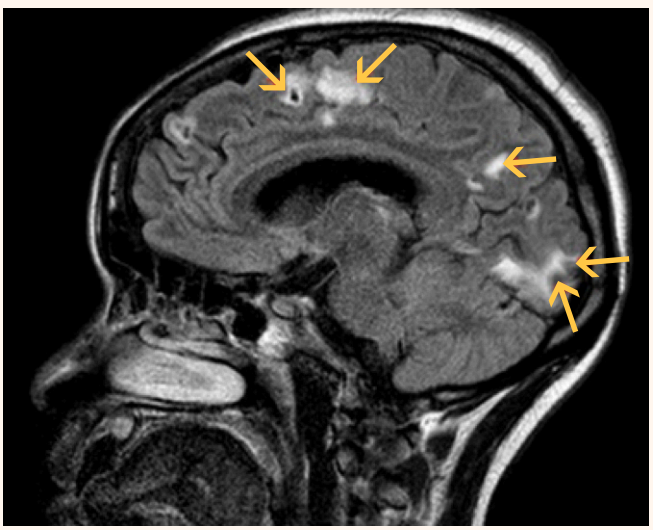


FIGURE 2:

Sagittal fluid-attenuated inversion recovery (FLAIR) image depicting multiple FLAIR signal hyperintensities involving subcortical U fibers (yellow arrows).



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QUESTIONS:

1. **What is the most likely diagnosis based on the patient's clinical presentation and imaging?**

   A. Toxoplasmosis

   B. Cytomegalovirus

   C. Progressive Multifocal Leukoencephalopathy

   D. Hodgkin Lymphoma

2. **What is the gold standard for diagnosing this disease?**

   A. Magnetic resonance imaging (MRI) of the brain

   B. Brain biopsy

   C. Polymerase chain reaction (PCR) of cerebrospinal fluid (CSF)

   D. Computed tomography (CT) of the head

3. **What is/are the treatment(s) for PML?**

   A. Antiretroviral therapy

   B. Interleukin (IL)-2

   C. Plasma exchange

   D. All of the above

ANSWERS:

1. **What is the most likely diagnosis based on the patient's clinical presentation and imaging?**

   Correct Answer:
   C. Progressive Multifocal Leukoencephalopathy

Progressive Multifocal Leukoencephalopathy (PML) is a subcortical white matter disease of the brain. It is progressive in nature and results in demyelination in multiple foci of the brain. It is caused by the Jakob Creuzfeldt virus (JCV) which affects the oligodendrocytes of the central nervous system (CNS). PML is an AIDS-defining illness, with about 5% of HIV patients developing PML.[1,2] Clinical features may consist of motor weakness, ataxia, seizures, memory difficulties, and dementia. Classically, PML on MRI will depict bilateral, multifocal, irregular demyelinating white matter lesions that are hypointense on T1-weighted images and hyperintense on T2-weighted and fluid attenuated inversion recovery (FLAIR) sequences.

Toxoplasmosis is another AIDS-defining illness caused by the parasite toxoplasma gondii. It can present clinically with flu-like symptoms, reduced or blurred vision, eye redness, and seizures. On T1-weighted precontrast MRIs, the lesions are typically hypointense in relation to the brain tissue.[3] On T2-weighted MRIs, the foci are usually hyperintense. After gadolinium is administered, ring enhancement occurs in most patients.[4] Cytomegalovirus is another AIDS-defining illness that is part of the human herpesvirus-5 family. CMV infection is most commonly asymptomatic, however, it can present as hepatitis, colitis, and pneumonitis.[5] The MRI may show subependymal signal changes along the lateral ventricles, septum pellucidum, corpus callosum and fornices.[6] Hodgkin lymphoma (HL) is a cancer that involves the immune system. Clinical features consist of B symptoms (weight loss, fever, fatigue, and night sweats) along with lymphadenopathy. It is uncommon to have CNS involvement in HL, consisting of only 0.2-0.5% of patients with HL.[7]

2. **What is the gold standard for diagnosing this disease?**

   Correct Answer:
   B. Brain Biopsy

Brain biopsy is the gold standard for diagnosing PML. The histopathologic hallmarks consist of a triad of multifocal demyelination, hyperchromic and amplified oligodendroglia nuclei, and enlarged astrocytes with lobulated hyperchromatic nuclei.[8] Brain biopsy carries a 93%-96% sensitivity, a 12% perioperative morbidity, and a 2% mortality.[8] Therefore, the diagnosis of PML is often made as a clinical diagnosis based on clinical judgment, imaging, and PCR for the JCV virus. MRI with and without gadolinium is most often used in imaging PML and is far more sensitive than a CT scan.[8]

3. **What is/are the treatment(s) for PML?**

   Correct Answer:
   D. All of the above

All of the answer choices above are possible treatment options for PML. Treatments with proven efficacy are lacking; however, through case reports and small clinical trials these treatment options have been used in clinical practice. IL-2 has been shown to play a part in stimulating T-cells which has been successful in treating PML; however, caution needs to be taken when using in patients with multiple sclerosis (MS) and PML.[9] Certain antivirals like acyclovir, cidofovir, brincidofovir, and ganciclovir have also been used in attempts to treat PML. In natalizumab-associated PML, plasma exchange is the standard of care because it accelerates the removal of the offending agent.[9] Clinical studies are underway and are analyzing different treatment modalities for PML along with prevention of JCV replication within cells. Education along with emphasis on initiation of HAART early on is key when talking to patients with HIV/AIDS.

DISCUSSION

Progressive Multifocal Leukoencephalopathy (PML) is a rare and potentially fatal neurological disorder most commonly seen amongst immunocompromised patients. PML occurs in approximately one in 200,000 people in the general population.[2] In the United States and Europe combined, an estimated 4,000 people are diagnosed with PML each year.[2] The pathogenesis involves a progressive, destructive, demyelinating process affecting the white matter parenchyma of the central nervous system (CNS). It is most frequently caused by the reactivation of

a virus known as the JCV in which approximately 85% of patients with PML are seropositive for antibodies against the virus.[10] JCV primarily infects the patient during childhood and remains latent within the kidney, lymphoreticular, or brain tissue until a setting of profound immunosuppression arises. The JCV will then cause lytic lesions of the CNS oligodendrocytes, sparing the optic nerves and spinal cord.[11] The immunocompromised populations most at risk for developing PML include those with HIV/AIDS (approximately 80% of cases), underlying hematologic malignancies, organ transplant recipients, and those on immunomodulating therapies such as Natalizumab for chronic inflammatory disorders such as Crohn's disease and Multiple Sclerosis (MS).[12] Currently, patients who developed PML following treatment with Natalizumab, make up the second largest group of patients with PML.[13]

As the name implies, PML is classically progressive in nature and characteristically affects multiple locations within the CNS. However, those treated with Natalizumab may frequently present with monofocal lesions, causing a diagnostic challenge for many physicians. The clinical presentation of the patient depends on the location of the disease. The most common neurological symptoms of PML include: altered mental status, vision loss due to occipital lobe lesions, motor weakness due to frontal lobe lesions, and ataxia from cerebellar lesions.[13] As the disease progresses, patients may also develop seizures. One study showed that 64% of patients experienced a seizure within the first year of diagnosis.[14]

The gold standard for diagnosing PML is via the histopathologic examination of a brain biopsy. However, with the advent of PCR detection of JCV DNA from CSF and the advances in neuroimaging technology, this combination in concordance with the appropriate clinical picture has supplanted the need for performing a brain biopsy.[15] Nevertheless, if neuroimaging and laboratory findings are reported as negative and the clinical suspicion for PML still remains high, a brain biopsy should be performed.[15] In regard to neuroimaging, magnetic resonance imaging (MRI) of the brain is preferred over computed tomography (CT) due to its much higher sensitivity. In some cases, MRI may even demonstrate pathologic lesions prior to the onset of clinical symptoms.[13] Classically, PML on MRI will depict bilateral, multifocal, irregular demyelinating white matter lesions that are hypointense on T1-weighted images and hyperintense on T2-weighted (Image 1) and fluid attenuated inversion recovery (FLAIR) sequences *(Image 2)*.[13] In order to differentiate from other similarly appearing CNS pathologies such as MS, careful examination will show that PML primarily affects the subcortical region of the brain with involvement of the U-fibers.[9] In addition, PML characteristically spares the optic nerves and spinal cord.[11]

Before the widespread initiation of HAART for patients with HIV, the incidence of PML was higher in patients prior to HAART versus those once HAART was established as the standard of care. In a large nationwide population-based cohort of adult HIV-1-infected patients, it showed the incidence per 1000 person-years at risk. In the pre-HAART years (1995-1996), the incidence was 3.3 cases, while in the late-HAART period (2000-2006), the incidence decreased to 1.3 cases.[16] Along with the diminished incidence, the establishment of HAART in HIV-infected individuals with PML led to a one-year survival improvement from 10% to approximately 50%, and in some cases showed a slight improvement and stabilization of the disease.[17] Unfortunately, most patients who survive will continue to have progressive neurological sequelae.

Due to its high mortality rate, the approach towards managing patients with PML should be focused on prevention at the primary care level. Adequate preventative strategies require a multidisciplinary approach, starting with the role of the primary care physician (PCP). A delay in diagnosis can be harmful to the patients via increased healthcare costs through unnecessary tests and treatments, failing to modify the progression of the disease, and causing emotional stress due to an inaccurate diagnosis which can later result in the fracturing of the patient-physician relationship. One study showed that another diagnosis was considered before PML in nearly two–thirds of patients, and more than three–quarters of PML patients experienced a delay in their diagnosis greater than one month, regardless of their underlying immunosuppressive status.[18] Therefore, it is important for the PCP to recognize the early signs and symptoms of PML, and It is imperative for the PCP to build a trustworthy relationship with the patient as most cases of PML are due to immunosuppression from underlying HIV infection. The PCP can play an active role in educating HIV-infected patients on PML and maintaining close surveillance of the patient to ensure adequate HAART adherence. In addition, the PCP should be cognizant of patients in need of immunomodulating agents such as Natalizumab and should screen for seropositivity towards the JCV prior to the initiation of therapy.[9] Although there is no specific treatment for PML, the goal for therapy should be to manage the underlying etiology and work to restore the host's immune function against the JCV.[1] While medications such as cidofovir and cytarabine showed promise, later studies revealed these medications failed to improve patient survival.

AUTHOR DISCLOSURES:
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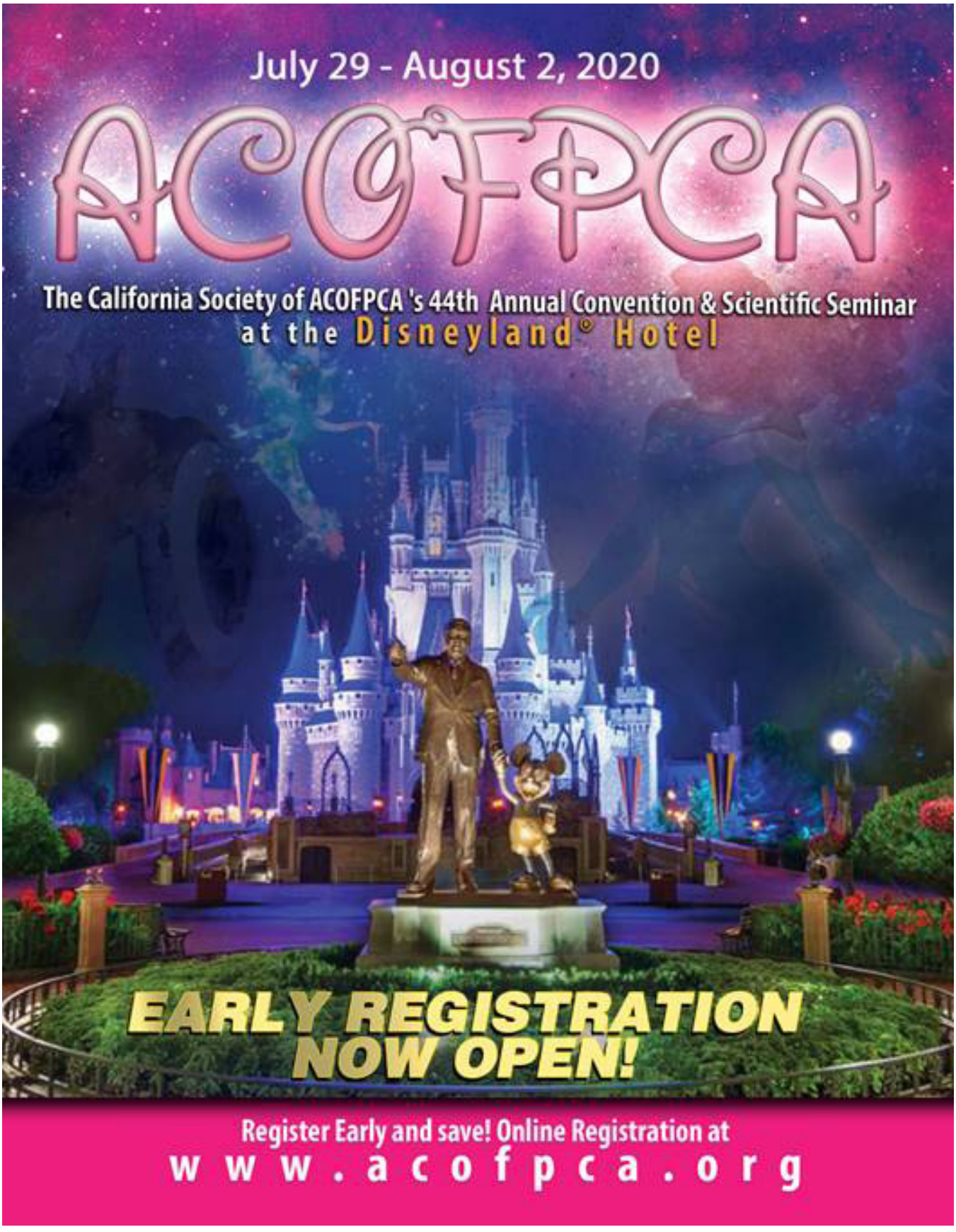
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PATIENT EDUCATION HANDOUT

Borderline Personality Disorder

Mary Mihalko, OMS-IV

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Borderline Personality Disorder (BPD) is a mental disease where people do things without thinking, have difficult relationships, and their mood changes a lot. In BPD, mood changes can be fast and can change in the same day. This is different from bipolar disorder where mood changes can last weeks or months. Early diagnosis and treatment mean recognizing troubling symptoms and talking with your physician about your worries. A diagnosis of BPD is often treated with therapy and medications. While these treatments are helpful, there are many things that you can do to help manage symptoms yourself.

HEALTHY COPING MECHANISMS FOR DEALING WITH BORDERLINE PERSONALITY DISORDER

- Exercise that gets your heart rate up should be treated as medicine to be taken every day. Exercise not only reduces weight gain but has also been found to lower stress and help keep your moods from changing.
- Keep a journal. Write down what makes your symptoms worse. Note things like arguments, stressful at work, and traumatic life events are common risk factors.
- Unfortunately, unexpected events such as a sudden death in the family can't be avoided. These hard situations are best handled by reaching out for help through therapy or close family and friends. Those with BPD often need more support than others in trying times, and it is a good idea to have a trusted therapist on speed dial.
- If you find yourself experiencing a strong feeling, like anger, allow yourself to feel it, but don't act on it.
- Avoid working night shifts or irregular hours, if possible. An irregular sleep schedule can be a trigger of BPD, and a routine schedule helps.
- Stay away from drugs, smoking, and alcohol. These substances can make your BPD symptoms start. However, DO take the medications prescribed to you by your physician, and report any symptoms, such as suicidal thoughts, as soon as possible.
- Keep safe! Don't keep guns in the house and get rid of any medicine that you no longer take. Have an action plan in place to get help if you feel suicidal.

SUICIDE PREVENTION

Unfortunately, death is high in those with BPD. If you find yourself having suicidal thoughts, don't hesitate to call the suicide hotline: 1-800-273-8255. You are not alone.

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SOURCE(S): *National Alliance on Mental Illness, National Institute of Mental Health, & Up-To-Date*

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