

Capstone Abstracts – Class of 2016

AN OVERVIEW ON FEBRILE SEIZURES - Blake, BM

Febrile seizure is the most common seizure disorder in children. Approximately 2-5% of children will experience a febrile seizure.² There are two types of febrile seizure: simple and complex. The two types vary in their characteristics and also in their prognosis. Simple febrile seizures are generally benign neurological events that carry an excellent prognosis. On the other hand, research shows an association between complex febrile seizures and temporal lobe epilepsy, which is the most common type of partial epilepsy.³⁹ This literature review will discuss the etiology, risk factors, diagnosis, and treatment of both simple and complex febrile seizures. The final section of this literature review will focus on the relationship between febrile seizures and temporal lobe epilepsy by summarizing current understanding of the association and suggesting potential future directions.

OVERVIEW OF ACNE ROSACEA AND TREATMENT BASED ON SUBTYPE -

Brandt, SR

Introduction- Acne rosacea is a common skin condition with a complex etiology. Rosacea is divided into four subtypes: erythematotelangiectatic (ET), papulopustular (PP), phymatous, and ocular rosacea (Table 1). This paper serves to outline the treatment options for each subtype, with a critical analysis of available evidence to compare efficacy and safety.

Methods- A literature search was conducted through Medline using key terms (Table 2). The highest quality studies were analyzed to form treatment recommendations for each subtype.

Results- ET rosacea is effectively treated by Intense Pulsed Light (IPL), Pulsed Dye Laser (PDL), or brimonidine 0.5% gel therapy. PP rosacea can be treated topically by ivermectin 1% cream, metronidazole 0.75% cream, or azelaic acid 15% gel, or systemically with oral doxycycline or isotretinoin. Phymatous rosacea is typically corrected through complete or incomplete surgical excision. Ocular rosacea is best treated with topical cyclosporine, but systemic doxycycline and topical azithromycin also alleviate symptoms.

Conclusion- While these interventions for rosacea have been shown to be safe with similar efficaciousness, further randomized controlled trials (RCTs) are needed that directly compare treatment options within each subtype. Patients could utilize this information, along with cost consideration (Table 3), to choose the most appropriate treatment for their rosacea.

TREATMENT OF ATRIAL FIBRILLATION - Dunlap, EI

Atrial fibrillation (AF) is the most common non-sinus cardiac arrhythmia, affecting 1% of the population in the US. People who have AF are five times more likely to experience a stroke and have higher morbidity and mortality than people without AF. Treatment of AF is complex and can be frustrating for patients and providers due to varying response rates and efficacy. Treatment modalities include stroke prevention with anticoagulation, rate control medications, and rhythm control, which includes antiarrhythmic medications, direct current cardioversion, radiofrequency catheter ablation, and surgical procedures. This paper discusses best treatment practices for long-term management of patients with AF, especially focusing on anticoagulation, rate control, rhythm control medications, direct current cardioversion, and radiofrequency catheter ablation.

A CLINICAL REVIEW OF PATELLOFEMORAL PAIN SYNDROME AND ITS TREATMENT - Ecklor, BL

Patellofemoral pain syndrome (PFPS) is one of the most common causes of anterior knee pain in runners causing nearly 25 percent of all identified knee injuries. PFPS is important to treat it has the ability to progress to severe osteoarthritis. Osteoarthritis in turn can cause eventual disability and need for joint replacement. The diagnosis of PFPS is one of exclusion, based primarily on a strong history and physical exam. The most common symptom of PFPS is anterior knee pain that is associated sitting with bent knees, climbing stairs, and sports activities that involve running. Multimodal treatment is considered to be the gold standard of therapy. This includes physical therapy that focus on strengthening of the quadriceps, patellar taping, and pharmacotherapy. Surgical intervention for PFPS is only considered as a last resort if non-operative measures have failed.

PANCREATIC DUCTAL ADENOCARCINOMA: A CLINICAL REVIEW –

Elfessi, NM

Introduction: Pancreatic adenocarcinoma is the fourth leading cause of cancer-related deaths and has a 5-year survival rate of roughly 5 percent.³ Signs and symptoms often do not appear until late in disease and patients' prognosis is poor. The only definitive treatment is surgical resection of the primary tumor; however, the cancer will likely recur. Although it can take years to develop, pancreatic cancer does not have a definitive method of screening. The aim of this review is to give a general overview of pancreatic cancer with a more focused look at potential screening methods. **Methods:** Search engines used include PubMed, EBSCOhost, ClinicalKey, UpToDate, and Oncology-based journals. **Results/Conclusion:** Imaging modalities such as CT, MRI, and EUS have high sensitivities and specificities for disease, but are not cost effective and come with associated risks. Serum modalities such as Ca19-9, miRNA, GPC1+, gene methylation changes, and elemental concentrations are more cost effective and safe; however, their sensitivities and specificities are not high enough to be considered effective for screening. To date there are no recommended screening methods for pancreatic cancer. More research with larger patient populations needs to be performed to increase the sensitivities and specificities of these testing modalities.

LIVER CIRRHOSIS: A CLINICAL REVIEW - Folcey, CJ

Introduction: Chronic liver disease and cirrhosis were responsible for more than 36,000 deaths in the United States in 2013.¹ Early diagnosis and management is crucial to reduce the risk of decompensated cirrhosis and its associated complications, such as ascites, hepatic encephalopathy, and variceal hemorrhage. The purpose of this review is to provide a detailed overview of the clinical presentation, diagnosis, management, and prognosis of cirrhosis with consideration of its complications, based on current research and guidelines. **Methods:** An extensive search of the literature was performed using the Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, MEDLINE, and PubMed. Initial searches utilized the following search terms: ascites, cirrhosis, encephalopathy, liver biopsy, liver fibrosis, and varices. **Results/Discussion:** Although liver biopsy remains the gold standard for diagnosing cirrhosis, it may be reasonable to utilize other less invasive diagnostic techniques, such as ultrasonography, in many patients. Transplantation remains the only treatment for cirrhosis and unfortunately the number of liver transplantation waitlist registrants continues to surpass the number of donor livers available for allocation. **Conclusion:** As the need for transplantation continues to outweigh organ availability, education and continued research regarding appropriate management is of the utmost importance.

A CLINICAL REVIEW OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE – Grabow, JR

Chronic Obstructive Pulmonary Disease is a major health concern in the United States with significant morbidity and mortality. Screening is not currently recommended for asymptomatic individuals although some research points to a possible benefit with early detection. Current diagnosis is based off of GOLD criteria of a fixed ratio of FEV1/FVC less than .7 with spirometry. Research is being done looking at diagnosis using a lower limit of normal determined by age and sex although no significant difference has been found yet. The major aspects of treatment of stable COPD include long acting beta agonists, anticholinergics, and inhaled corticosteroids with tiotropium showing the best results as a first line agent. Using all three classes has been shown to be superior to individual agents although it is unknown how it impacts a patient's quality of life. Acute COPD exacerbations should be treated with systemic corticosteroids, antibiotics, and NPPV oxygen therapy in the hospital. Outpatients can be treated with corticosteroids and antibiotics as needed.

A Clinical Review of the Initial Management and Prevention of an Opioid Overdose - Hultmark, KL

Morbidity and mortality secondary to acute opioid overdose has been rising over the last several decades, making it a huge public health concern.^{1,2} Efforts to improve rapid diagnosis and treatment of the acutely intoxicated patient have been at the forefront of emergency departments, emergency medical service (EMS) personnel, and public health programs. This clinical review discusses the epidemiology and risk factors for opioid use and abuse, presents the typical physical exam finding of a patient who is experiencing an opioid overdose, and reviews the initial medical management of such a patient. This literature review also addresses several key clinical questions including equal efficacy of intranasal naloxone compared to intramuscular naloxone, the use of codeine in children who may unknowingly be ultra-metabolizers, and the effectiveness of layperson administration of naloxone through opioid overdose prevention programs. Future directions for research and applications to clinical practice are also discussed.

MRI-FOCUSED ULTRASOUND FOR THE TREATMENT OF UTERINE FIBROIDS: A COMPARATIVE ANALYSIS TO HYSTERECTOMY, MYOMECTOMY, AND UTERINE ARTERY EMBOLIZATION – Jooss, LM

Objective: To compare the efficacy of magnetic-resonance guided focused ultrasound (MRgFUS) therapy for women with uterine fibroids to myomectomy, uterine artery embolization (UAE), and hysterectomy in terms of patient quality-of-life and symptom severity.

Methods: A literature search was performed using the MEDLINE, CINAHL, and Cochrane databases with the following search terms: uterine fibroid, focused ultrasound, leiomyoma, leiomyomata, and ablation cross-searched with UAE, hysterectomy, myomectomy, and myolysis. Four trials were identified-two comparing MRgFUS to UAE, one to myomectomy, and one to hysterectomy.

Results: UAE treatment was superior to MRgFUS both in symptom improvement and re-intervention rates. Hysterectomy was superior to MRgFUS in quality-of-life improvement. MRgFUS was comparable to myomectomy in symptom improvement. **Conclusion:** MRgFUS is a safe and efficacious treatment intervention, but eligibility is limited and there is significant risk that re-intervention will be necessary. Current evidence finds UAE and hysterectomy to be more effective than MRgFUS, while myomectomy showed comparable results. However, validity concerns significantly discredit the UAE and hysterectomy trials. Randomized trials comparing MRgFUS to other interventions are needed to clarify where this treatment fits in the hierarchy of uterine fibroid treatment.

PEDIATRIC HYPERLIPIDEMIA: A REVIEW OF THE CURRENT GUIDELINES ON SCREENING AND MANAGEMENT – Mages, SM

Over 600,000 adults die from heart disease every year, with more than half of those deaths resulting from coronary heart disease.¹ Coronary heart disease involves the development of atherosclerotic plaque in the blood vessels of the heart. Although there are many risk factors for atherosclerosis and coronary heart disease, elevated lipid levels within the blood stream, or hyperlipidemia, is of particular significance as cholesterol and triglycerides are involved in the inflammatory response and subsequent buildup of plaque within the arterial lumen.² Because of this, it is important that all patients with hyperlipidemia are identified and properly managed. It is now known that plaque buildup can begin during childhood if cardiovascular risk factors, such as elevated lipid levels, are present. There are several guidelines that provide recommendations on proper screening and management of childhood hyperlipidemia so as to avoid significant atherosclerosis and coronary heart disease later in life. Those guidelines, as well as the evidence behind them, will be reviewed here.

An Overview of Non-ST Elevation Acute Coronary Syndrome and its Variable Therapies – Moon, AR

Introduction: More than 780,000 cases of acute coronary syndrome (ACS) occur in the United States yearly, and approximately 70% are due to non-ST elevation ACS (NSTE-ACS). The management of NSTE-ACS is inconsistent and needs to be reviewed.

Methods: The following databases were searched – Cochrane Database, Medline, and PubMed. Popular search terms included: “non ST elevation”, “myocardial infarction”, and “acute coronary syndrome”. Reference lists were used to find additional sources.

Results: At 17 months, invasive strategy reduced death or MI (OR 0.82, 95% CI 0.72-0.93) compared to conservative strategy. Comparison of early to delayed invasive strategy found no significant reduction in death (OR 0.83, 95% CI 0.64-1.09), except for high risk patients. Patients taking clopidogrel and aspirin compared to aspirin alone had decreased death from CV causes, nonfatal MI, or stroke (RR 0.80, 95% CI 0.72-0.90). At least 5 days clopidogrel washout vs. no clopidogrel before CABG resulted in decreased mortality or MI (OR 0.60, 95% CI 0.44-0.81). Fondaparinux reduced death, MI, or refractory ischemia at 30 days compared with enoxaparin (HR 0.83, 95% CI 0.71-0.97).

Conclusion: While varying strategies for the management of NSTE-ACS are commonly accepted in clinical practice, research favors specific treatment modalities in special patient populations.

Irritable Bowel Syndrome: Overcoming the Diagnostic and Management Challenges of a Complex Condition – Pehler, JM

Introduction/Objective: Irritable Bowel Syndrome (IBS) is the most common, chronic functional gastrointestinal disorder worldwide. IBS patients often have a significantly decreased quality of life and other comorbidities, making it a potentially devastating syndrome. Pathophysiology of the syndrome is currently unknown, which causes diagnostic and treatment challenges. Diagnosis and treatment are based on symptoms, but both current diagnostic measures and management of symptoms lack efficacy. The purpose of this review is to give primary care providers an update on current findings about the syndrome and to provide an approach to care for patients with suspected or known IBS.

Search: MEDLINE, CINAHL, and many other databases were searched using the terms: IBS, Irritable Bowel*, treatment*, prevalence, incidence, gender, symptom*, diagnos*, prognosis, etc.

Results/Conclusion: Patient-oriented care is the best approach in managing IBS, with an emphasis on education. Diagnosis should be made using diagnostic criteria in the absence of warning signs with limited other tests. Treatments should be offered based on symptoms, patient preferences, and tailored until adequate relief is found. Providers should be aware of future research on diagnostic tests, treatments, and the pathophysiology of IBS to best be able to care for their patients.

A CLINICAL OVERVIEW OF PSORIASIS VULGARIS – Poterucha, MT

Psoriasis is a chronic condition that affects 2-3% of the population of the United States. It costs the health care system and patients over \$2 billion per year and has been shown to cause a substantial decrease in quality of life. Psoriasis is associated with a variety of comorbidities and is believed to have systemic inflammatory effects. The genetics and pathophysiology of the disease continue to be explored and great strides have been made in the understanding and treatment of this condition. While 80% of patients can be managed with topical regimens, those with more widespread disease may require systemic therapy. Cost of medications can be substantial and influences prescribing practices. Providers must have an understanding of the efficacy and costs of treatment options in order to ensure good outcomes.

A CLINICAL REVIEW OF CHRONIC ORAL ANTICOAGULATION THERAPY – Rau, CA

INTRODUCTION: Oral anticoagulation (OAC) has been established for more than half a century as highly effective therapy for decreasing the risk of stroke and mortality in patients. The most common clinical conditions associated with an elevated risk of stroke are atrial fibrillation, mechanical valve replacement, and recurrent venous thromboembolism. As our population ages and medical/surgical interventions increase the longevity of patients with these chronic conditions, considerably more patients have an indication for indefinite OAC.

METHOD: Search conducted utilizing Cochrane, MEDLINE, and PubMed using terms “anticoagulation AND chronic.”

RESULTS: The mainstay of OAC has been warfarin, a vitamin K antagonist. However, warfarin has substantial drawbacks, such as increased risk of bleeding, drug-drug interactions, dietary restrictions, and a narrow therapeutic window. Rivaroxaban, apixaban, and dabigatran are novel OACs with non-inferior efficacy and tend to have superior safety in comparison to warfarin.

CONCLUSION: This study provides a clinical review of OAC in the wake of an aging population with a new generation of oral anticoagulants

A CLINICAL REVIEW OF HUMAN PAPILLOMAVIRUS VACCINATION – Ruda, CR

Human papillomavirus (HPV) is the most commonly transmitted sexual infection in the United States.¹ Over 150 strains of HPV exist which selectively infect different tissue types. HPV typically occurs as a transient infection, although persistent infection can lead to verrucous lesions, precancerous changes, and cancer. The focus of this review is HPV and its relationship to cervical cancer. Since 2006, vaccines have been utilized in attempts to decrease cervical cancer rates and prevent various types of HPV infection. These vaccines have proven to be safe and effective, yet vaccination rates in the United States are disappointingly low. Although several factors and misconceptions appear to contribute to these low rates, lack of provider recommendation appears to be the most important. Programs across the country are currently in progress to improve vaccination rates through various educational modalities. Other countries have demonstrated successful vaccination campaigns through free school-based initiatives which would likely also be successful in the United States. This paper explores the link between HPV and cervical cancer, the vaccines available to prevent HPV infection, the reasons for such low vaccination rates, and the current initiatives in place to increase these rates.

BLOOD TRANSFUSION PROCESS AND REACTIONS: A CLINICAL REVIEW – Schwinghammer, AJ

Introduction: Transfusion of blood products is a potentially lifesaving treatment for anemia. Major strides have been taken to improve safety of this practice but serious complications arise. This clinical review seeks to present current evidence based recommendations for transfusion thresholds as well as diagnosis and treatment of the most common of these complications.

Method: PubMed, MEDLINE, and ClinicalKey databases were searched for current quality data on transfusion criteria and reactions.

Results: The reactions covered are as follows: Allergic reaction, febrile non-hemolytic reaction (FNHTR), transfusion-related acute lung injury (TRALI), transfusion-associated circulatory overload (TACO), acute hemolytic transfusion reaction (AHTR), and transfusion-transmitted infection (TTI). Specifically acute complications are reviewed: their pathophysiology, incidence, presentation, and treatment. In addition, current issues surrounding transfusion medicine are reviewed including the developing blood shortage and status of the ongoing search for the ever-elusive blood substitute.

Conclusion: The blood supply in developed countries is safer than ever for both donors and recipients. There are, however, still risks and every provider who encounters patients receiving blood transfusions should be equipped to manage acute complications effectively. It is clear that there remains many areas of study to be done in both usage of human blood products and development of blood substitutes.

AN OVERVIEW OF HOSPICE CARE – Swartz, MR

Introduction: Demand for end-of-life care will continue to increase as the population ages. Hospice is a multi-disciplinary service that attends to a terminal patient's physical, spiritual, and psychosocial needs in an effort to decrease overall suffering during the dying process.

Methods: A literary search was conducted using the Medline, Cinahl, and Cochrane databases. Restrictions of English language and publication since 2005 were used. MeSH terms included hospice, end-of-life care, and terminal care. Bibliographies of relevant articles were reviewed.

Results: Admission to hospice is limited by the patient's disease state, as well as inaccuracies in prediction of patient survival. Patients who receive hospice services experience less existential and physical pain, and are more likely to perceive their death as "good." End of life medical expenditures are also decreased due to less hospitalizations and use of aggressive therapies.

Conclusion: Hospice is an effective means of improving the lives of terminal patients in multiple capacities. Understanding who and when to refer will become important as clinicians encounter more patients with advanced disease. Higher quality research is needed to further define the benefits of hospice for patients, family members, and the health system.

EFFECTIVE CONTRACEPTION FOR ADOLESCENTS – Toye, MD

Introduction/Objective: The rate of adolescent pregnancy in the United States (U.S.) is significantly higher than in most other developed countries. Unplanned teenage births result in significant personal, economic and social costs. The most important factor contributing to the high rate of unintended pregnancies among adolescents in the U.S. is that teens fail to use the most effective contraceptives available.

Methods: To study the most effective contraceptives for preventing unintended pregnancies in adolescents, I used the MEDLINE and UpToDate databases and searched on numerous terms including teenage pregnancy, adolescent contraception, long-acting reversible contraception (LARCs) and contraceptive effectiveness.

Results: Two large studies involving 1,404 and 14,183 adolescents, respectively, demonstrated that it is possible to significantly increase the utilization of highly effective contraceptives (long-acting reversible contraceptives or LARCs) by adolescents, which resulted in a statistically significant reduction in teenage pregnancy rates, birth rates, abortion rates and the proportion of high-risk births.

Conclusion: Adolescent girls who were provided contraception at no cost and educated about reversible contraception and the benefits of LARC methods had rates of pregnancy, birth, and abortion that were much lower than the national rates for sexually experienced teens.

THORACIC AORTIC DISSECTIONS – Ziegler, C

Objective: This paper will provide an overview of thoracic aortic dissections (TADs), with an emphasis on genetic predispositions and TADs that result in sudden death. The International Registry of Acute Aortic Dissections (IRAD) will be referenced, and its shortcomings, specifically related to epidemiology and mortality, will be addressed. New research will also be discussed.

Method: Literature searches were performed using Medline and the Cochrane Database of Systematic Reviews. Bibliographical literature searches were then performed on relevant articles.

Results: TADs are strongly associated with certain genetic syndromes, and in individuals with genetic predispositions, dissections occur at a younger age than in individuals without a genetic predisposition. It is becoming increasingly recognized that Familial Aortic Aneurysm and Dissection syndrome is responsible for a large proportion of dissections previously described as idiopathic. The IRAD does not include individuals who experience sudden death, and therefore, mortality and incidence is likely underestimated. Population studies show that approximately 50% of Stanford type A dissections result in sudden death. Cardiac tamponade is responsible for the majority of deaths that result from TADs.

Conclusion: TADs often result in sudden death and more research is needed to improve the overall prognosis of this lethal disease.