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Abstract Number: 1

Category: Resident
Study Design: Quality Improvement
Presentation Type: Poster
Location: Dean's Entrance

3D Printed Training Simulator for Pediatric Upper GI Fluoroscopy

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Problem

Learning the skills used to master pediatric fluoroscopic exams can be challenging. Hand-eye coordination and specific timing is required while at the same time being mindful of radiation dose and interpreting the images generated in real time. Training on live neonates will often mean less diagnostic exams and increased radiation dose for those exams.

Baseline

An inexpensive reusable simulator model was devised to allow residents practice of upper GI fluoroscopic exams to increase efficiency using ALARA principles and utilizing 3D printing technology and off-the-shelf dolls.

Design

The 3D model was fashioned in Fusion 360 to try to best replicate the full duodenum and effect of the ligament of Treitz. The final iteration of the model was printed in polylactic acid polymer (PLA) in a size that would fit inside the plastic doll, which already contained portions of the necessary tubing. The model was sealed to be watertight.

Results

Testing under fluoroscopy showed that the model behaved similar enough to an infant when placed in various positions then filled with an appropriate volume contrast.

Conclusion

There are several limitations of this model including the lack of the distractions of a real pediatric patient. Also, the flow of contrast is purely gravity dependent without the effects of sphincters and peristalsis. Overlying skeletal structures and bowel gas are not represented, however these could also be simulated in various ways. Future work on this and similar projects could include expansion into other organ systems such as the colon.

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Category: Resident
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Presentation Type: Poster
Location: Dean's Entrance

Team-Based Approach to Improve Fluoride Varnish Rates in an Outpatient Clinic

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Problem

Childhood caries is the most common pediatric chronic condition and is especially prevalent among vulnerable populations with limited access to pediatric dental services but adequate access to primary care. Thus, a pediatric clinic becomes important in maintaining pediatric dental health. Our quality improvement study attempts to implement a team-based approach in order to improve fluoride varnish rates in our pediatric clinic.

Baseline

A retrospective chart review was performed to establish baseline fluoride varnish rates during well-child visits. All children aged 6 months to 10 years of age who presented for well-child visit qualified for a fluoride varnish.

Design

Intervention consisted of dental education that was provided to health-care professionals. Education was incorporated into various team meetings across the clinic. Fluoride varnish rates were monitored post-intervention and re-education was performed after 4 months.

Results

Overall rate improved from 4.6% to 8.2%. However, varnish rates over time diminished despite re-education. The greatest increase in varnish rates were seen in infants aged less than 2 years ($p = 0.0003$). Also, infants seen by mid-levels had the greatest increase in varnish rates.

Conclusion

Varnish rates do improve with team-based approach in a clinic setting. However, over time, there was a reduction of varnish rates due to no established protocol. The next step would be to explore effectiveness of protocol targeted towards the entire clinic team.

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Study Design: Quality Improvement
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Location: Dean's Entrance

Appropriate Ordering and Management of Serum Lactate in Septic Patients: A Single Institution Quality Improvement Initiative

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Problem

The 2016 Surviving Sepsis Guidelines recommend measuring lactate and following levels serially until normalization to help guide resuscitative measures. Several randomized control trials suggest 1-3 hour intervals. Our objective was to determine whether physicians at our hospital are following lactate levels to direct therapeutic decisions.

Baseline

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Design

A retrospective chart review was conducted of patients diagnosed with sepsis, severe sepsis, or septic shock between 1/1/2017 and 12/31/2017 and managed by KU staff at Via Christi St. Francis. Patient charts were reviewed for timing of first three lactate draws, appropriate lactate clearance (>10%/hour), hemodynamic parameters (MAP, Hb, O2 sat), practitioner intervention (fluids, vasopressors or inotropes, transfusion, oxygen), length of hospitalization, and mortality.

Results

Fifty-six of the seventy-eight patients identified for chart review had elevated lactate levels (>2.0 mmol/L). The average time between first and second lactate draws was two hours for ED physicians, 3.5 hours KU faculty, and >8 hours for KU residents. The average time between second and third lactate draws was >5 hours for all providers. Appropriate physician intervention was documented in 95% of patients with elevated lactate plus abnormal hemodynamic parameters compared to 34% among patients with poor lactate clearance independent of hemodynamic parameters. Length of hospitalization was longest for patients with poor lactate clearance and no intervention.

Conclusion

The average time between lactate draws was longer than what is suggested. Appropriate interventions were seen inconsistently in patients with poor lactate clearance, and these patients had prolonged hospital stays compared to those who received intervention.

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Abstract Number: 4 Location: Dean's Entrance

Category: Student

Multivariate Approaches to Evaluating Quality in Trauma Care

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Problem

The need to assess the performance of healthcare systems to improve quality and reduce costs has gained increasing attention in recent years. The Trauma Quality Improvement Program (TQIP) developed a database to measure and compare trauma centers' performance. In 2001 the Institute of Medicine (IOM) proposed six aims to guide quality improvement efforts: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity of care. However, most quality improvement programs still use one aim at a time, often corresponding to effectiveness. In this study, the viability of using all the IOM quality aims in the evaluation of trauma care quality is investigated.

Baseline

N/A

Design

Data from the Michigan-TQIP is used to quantify quality metrics associated with each aim. Correlation analysis is used to identify relationships between metrics, and composite measures are developed to represent each aim. The traditional, univariate analysis approach is compared with two other approaches involving more than one aim at a time: (1) combining all aim-metrics into a single composite measure of quality to replicate the traditional analysis methods and (2) using deterministic dominance theory to overcome the heterogeneity of quality metrics.

Results

The two multivariate approaches produced different categorizations of trauma centers.

Conclusion

The results indicate that considering several aims at a time may add value to performance evaluation. The single composite approach had limitations related to the types of metrics that could be used. Thus, we recommend using the deterministic dominance theory approach when considering more than one dimension of quality in performance evaluation.

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Study Design: Quality Improvement
Presentation Type: Poster
Location: Dean's Entrance

Postpartum Depression Screening in a Pediatric Clinic: A Quality Improvement Project

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Problem

Postpartum depression (PPD) is a common illness affecting up to 19% of mothers. Children of mothers who experienced PPD have demonstrably more cognitive, social/emotional, and language development difficulties. Evidence supports that screening programs for postpartum women have a positive effect on the near-term mental health status of these women.

Baseline

This quality improvement (QI) project aimed to implement a standardized process for promoting screening mothers at postpartum visits throughout our pediatric clinic.

Design

Education was given to providers and nursing staff about the importance of postpartum depression screening in mothers and through print materials displayed in the clinic. The EMR templates were adjusted to support documentation of PPD and capture. The clinic adapted its procedures to administer the Edinburgh Postnatal Depression Scale (EPDS) [attached] to mothers at the 1 month, 2 month, 4 month, or 6 month visits. The questionnaire was given in paper form at check-in and women were asked to fill out the form as they wait or while they are roomed. The results were calculated and recorded by the nurse or medical assistant prior to the provider seeing the patient, and the provider and social worker were notified of a positive score. The documentation of PPD screening in EMR was how we measured the effectiveness of our intervention.

Results

After 2 weeks of process implementation, 92% of mothers were screened. By the end of 6 weeks, there were a total of 336 encounters with 87% of mothers screened.

Conclusion

We were effectively able to implement a postpartum screening process in clinic.

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Study Design: Basic Science
Presentation Type: Poster
Location: Sunflower

Validation of Different Combination of Three Reversing Half-Hitches Alternating Posts (RHAPS)
Effects on Arthroscopic Knot Integrity

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Introduction

With arthroscopic techniques being used, importance of knot tying has been examined. Previous literature has examined the use of reversing half-hitches on alternating posts (RHAPs) on knot security. Separately there has been research regarding different suture materials commonly used in the operating room. The specific aim of this study was to validate the effect of different stacked half-hitch configuration and different braided suture materials on arthroscopic knot integrity.

Methods

Three different suture materials tied with five different RHAPs in arthroscopic knots were compared. A single load-to-failure test was performed and the mean ultimate clinical failure load was obtained.

Results

Results demonstrated significant knot holding strength improvement when one half hitch was reversed as compared to baseline knot. When two of the half hitches were reversed, there was even a greater improvement with all knots having a mean ultimate clinical failure load greater than 150N. Comparison of the suture materials demonstrated a higher mean ultimate clinical failure load when ForceFiber was used and at least one half-hitch was reversed. Knots tied with either ForceFiber or Orthocord showed 0% percentage chance of knot slippage while knots tied with Fiberwire or braided fishing line had about 10% and 30% knot slippage chances respectively.

Discussion

We observed a significant effect in regards to both stacked half-hitch configuration and suture materials used on knot loop and knot security. Caution should be used with tying with three RHAPs in arthroscopic surgery particularly with a standard knot pusher and arthroscopic cannulas.

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Device for Actively Monitoring the Integrity of Intrathecal Catheter Systems

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Introduction

By the year 2024, the pain management industry is expected to grow to a 220 million dollar market. It is estimated that 20-30% of adults battle chronic pain that has been caused by disease or traumatic injury. The Intrathecal Pain Pump (IPP) is a commonly used modality in the pain management industry to elucidate patient pain and increase overall quality of life. This implanted device releases a constant stream of medication to the patient in an effort to manage their chronic levels of pain.

Methods

PainX analyzed the IPP and focused design efforts on developing a way to monitor the health and longevity of the catheter system used by the pump. We developed the ConnectXP, a newly designed catheter connector that joins two ends of the catheter system and monitors pressure of medication flowing between them. To test the ability of the sensor to monitor pressure change, water was flowed through the prototype at varying speeds.

Results

From testing results, the optimal placement of the pressure sensors was determined for the large scale prototype. The threshold between pressure differences was also determined through the testing phase to ensure that there would be sufficient differences when the model was scaled down to its true size.

Discussion

The ConnectXP fills a void in the pain management industry by providing physicians with accurate, useful data to monitor the health of implanted catheter systems. By optimizing sensor location, PainX will downsize the prototype to the devices actual working size before pursuing FDA approval.

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Randomized Trial of Belladonna and Opiate Suppository During Intradetrusor Onabotulinum Toxin A Injection

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Introduction

We aimed to evaluate the effectiveness of belladonna and opiate (BO, belladonna alkaloid with morphine 16.2/7.5mg) suppository in adjunct to standard anesthesia for in-office intradetrusor onabotulinum toxin A (BTX-A) treatment. We hypothesized addition of a BO suppository would reduce bladder injection pain.

Methods

This was a prospective, randomized, double-blind, placebo-controlled study of patients undergoing standardized BTX-A bladder injection at a single clinic. Participants were randomized to receive a BO or placebo suppository, placed immediately before lidocaine-based anesthesia. Participants reported bladder pain using a 0-10 numeric rating scale before anesthesia and suppository (P0), 40 minutes after anesthesia and suppository (PA), after first 10 bladder injections (P10), and immediately after completing 20 injections (P20). Primary outcome was change in pain from anesthetic baseline to mid-procedure (P10-PA). A sample size of 26 was calculated in order to detect a 50% difference in P10-PA with 80% power. An intent-to-treat approach was used.

Results

Twenty-six participants were enrolled and randomized with 13 in each study arm. There were no statistically significant differences in demographics (except age) or medical comorbidities between the groups. Median P10-PA for the placebo group and treatment group was 4 (range 1,10) and 5 (range 0,9), respectively ($p=0.94$). Median P20 scores for the placebo group and treatment group were 3 (range 0,10) and 2 (range 0,8), respectively ($p=0.29$). There were no significant differences in pre-injection pain scores reported at P0 and PA.

Discussion

Addition of BO suppository to standard lidocaine-based anesthesia provided no added benefit to significantly reduce bladder injection pain.

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Efficacy of Epsilon-Aminocaproic Acid on Blood Management in Primary Total Knee Arthroplasty

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Introduction

A total knee arthroplasty (TKA) is a common procedure that can result in significant blood loss requiring a blood transfusion. Epsilon-Aminocaproic Acid (EACA) is an antifibrinolytic agent that has been used in cardiac and orthopaedic surgeries to reduce bleeding. This study evaluates the use of EACA in primary total knee arthroplasty.

Methods

This is a retrospective study of consecutive primary TKA patients from January 2011 through June 2014 at a single institution with two parallel surgical groups. The study group received EACA during the surgery and the control group did not receive any antifibrinolytic agent. The primary outcome tracked was the rate of blood transfusions after surgery.

Results

A total of 2,128 patients underwent TKA. There were 1,061 patients in the EACA use group and 1,067 patients in the control group. Thirty-four patients (3.2%, 24 female and 10 male) required a blood transfusion in the control group, whereas in the EACA use group only five patients, all female, received a blood transfusion (0.5%). 111 patients underwent bilateral TKA, 102 patients in the EACA group, and 9 patients in the control group. 100% of patients in the bilateral control group required a transfusion, compared to 20% in the EACA group.

Discussion

EACA is an effective antifibrinolytic in lowering the rate of blood transfusions in patients undergoing TKAs.

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Study Design: Research
Presentation Type: Poster
Location: Sunflower

Urine Screening for Opioid and Illicit Drugs in the Total Joint Arthroplasty Population

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Introduction

Recent studies have shown an increase in post-operative orthopaedic complications associated with pre-operative opioid use. Furthermore, the purpose of this study assessed if urine drug screen (UDS) is an effective screening tool for detecting drug use. Thus, trying ultimately to minimize complications and readmissions following joint arthroplasty (JA).

Methods

Study design was approved by the IRB. This retrospective chart review was performed on 166 out of 172 consecutive patients in a community-based practice. All the patients had a pre-operative UDS prior to primary or revision JA by a fellowship trained orthopaedic surgeon between March 2016 and April 2017. Patient's demographics, documented pre-opioid & illicit drug use, co-morbid diagnosis, and UDS results were collected from clinical charts. Pearson Chi-square, Fisher's exact, McNemar and t-tests were conducted with IBM SPSS Statistics, ver. 23. Significant differences were $p < 0.05$.

Results

38.6% (64 out of 166 patients) tested positive for opioids. When evaluating those patients with a positive opioid drug screen, 55% (35/64) had no history of prescription opioid use. Of these patients, 28% did not disclose opioid use prior to the UDS. Significant differences were observed for comparing the test results of the UDS with the patient reported history of prescribed opioids, $p = 0.001$. 6.0% (10/166) of patients had their surgery cancelled because they tested positive either for cocaine, heroin or amphetamines.

Discussion

With a significant number of patients not disclosing pre-opioid and illicit drug use on exam. UDS may be necessary for initial risk assessment for patients undergoing JA.

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Study Design: Research
Presentation Type: Poster
Location: Sunflower

Complications Related to a Novel Limited Oblique Incision in the Direct Anterior Approach for Primary THA

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Introduction

This retrospective clinical study summarizes the complication incidence of the limited oblique direct anterior approach (DAA) during primary total hip arthroplasty (THA).

Methods

Retrospective chart review of 257 patients receiving primary THA with a limited oblique incision by a single surgeon from November 2008 to August 2013. The wound complications, deep infection, and incidence of secondary procedures were recorded. Patient information including co-morbidities, BMI, and presence of lateral femoral cutaneous nerve symptoms was also recorded and analyzed.

Results

Deep infection was defined as requiring formal irrigation and debridement in the operating room or requiring a two-staged removal of hardware with re-implantation. Wound complications were defined by non-operative treatment including persistent wound drainage with extended dressing changes, eschar at the wound site, and delayed healing at the incision. There were 7 deep infections (2.7%) and 9 wound complications (3.5%) among the 257 patients. There was no statistical difference between this group of data and that in the hospitals in which surgery was performed ($p>.05$). Co-morbidities and BMI were not associated with these complications ($p>.05$). Transient LFCN were found in 4.3% of patients on follow-up.

Discussion

The limited oblique incision for DAA appears safe and effective for use in primary THA. The deep infection and wound complication rates in this study appeared comparable to that for the traditional longitudinal DAA hip incision in two different hospitals. Furthermore, co-morbidities or BMI was not associated with these complications. However, a large randomized prospective study is warranted to fully address the comparison.

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Study Design: Research
Presentation Type: Poster
Location: Sunflower

The Cost of Routine Follow-Up in Total Joint Arthroplasty and the Influence of These Visits on Treatment Plans

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Introduction

Many physicians recommend annual or biennial visits after total hip and knee arthroplasty (THA and TKA). This study sought to establish the cost of a post-operative visit to both the health care system and patient as well as identify if these visits altered patient management.

Methods

A prospective cohort study was conducted on follow-up patients after THA or TKA from a single surgeon's practice between April and December 2016. All eligible subjects completed a questionnaire about the personal cost of the visit and the assessment of their function outcomes after total joint arthroplasty. The physician also completed a questionnaire that examined the cost of the visit to the health care system and whether the clinical or radiographic findings altered patient management.

Results

Fifty-six patients participated with an average length of follow-up of 4.5 ± 4.1 years since surgery. The average patient cost was $\$135.20 \pm \190.53 , and the visit time for patient averaged 3.9 ± 2.9 hours. 80% of patients reported no pain while 11% claimed function loss. 84% of patients thought the visit was necessary. Physician time for each visit lasted 12.9 ± 3.7 minutes, only 9% of patients resulted in an alteration in management which occurred at an average follow-up time of 3.6 ± 1.8 years after the index procedure. The average cost of each visit to the health care system was $\$117.31 \pm 60.53$ (range, $\$93.90$ - $\$428.28$).

Discussion

The majority of the routine follow-up visits after THA and TKA did not result in an alteration in patient management but did add substantial cost to the health care system.

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Study Design: Basic Science
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Examining how a Dynamic Substrate can Affect Human Wharton Jelly Cells

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Introduction

Growing stem cells on a malleable substrate such as Parafilm, can serve as a useful model for wound healing and how mechanical forces influence cells. Our objective is to evaluate the expression of cytoskeletal proteins when a micro puncture is applied to Human Wharton's Jelly Cells (hWJCs) grown on parafilm. We hypothesize that hWJCs would express increased amounts of alpha-Smooth Muscle Actin in response to a micro puncture in attempt to close the puncture. In addition, we were interested in seeing how the expression of cytoskeletal proteins such as Talin, Collagen I, and Vimentin changed when the cell substrate was punctured.

Methods

hWJCs were cultured on parafilm or glass coverslips for up to 14 days. Parafilm coverslips were micro punctured with a 28.5-gauge needle at Day 8. Samples were chemically fixed and examined via immunocytochemistry at Day 2, 9, and 14 post cell seeding. Samples were examined for nuclear character, F-actin, Collagen 1, alpha-Smooth Muscle Actin, Vimentin, and Talin. Samples containing punctured parafilm coverslips were compared to plates containing glass or unpunctured parafilm coverslips at Day 9 and 14.

Results

Vimentin appeared to be up regulated in hWJCs around the parafilm puncture site at Day 9 and 14. The expression of other cytoskeletal markers at these time points varied.

Discussion

The puncturing of parafilm induced a clear change in the expression of cytoskeletal proteins, such as Vimentin, and suggests that dynamic changes in cell substrate affect cytoskeletal expression.

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TEG After Cardiopulmonary Bypass: Does it Save Blood Products?

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Introduction

The accurate assessment of anticoagulation reversal following cardiopulmonary bypass (CPB) minimizes transfusion of blood products. Thromboelastography (TEG) is a functional coagulation test that measures mechanical properties of blood clot formation and fibrinolysis. This study aims to determine if TEG is associated with reduced blood product administration following CPB compared to traditional coagulation tests.

Methods

A retrospective chart review was conducted of 698 patients who underwent CPB at Via Christi Saint Francis from February 16, 2014 - February 16, 2015 (Period I) and May 16, 2015 - May 16, 2016 (Period II). Traditional coagulation tests guided transfusion during Period I and TEG guided transfusion during Period II. Intraoperative and postoperative administration of red blood cells, fresh frozen plasma, platelets, and cryoprecipitate were recorded. Blood product administration during Period I was compared to Period II using an independent-samples T test via SPSS version 19.

Results

During intraoperative transfusion, we observed a significant decrease in blood product administration when TEG was utilized ($p < 0.001$). Specifically, transfusion of fresh frozen plasma was significantly decreased when TEG was utilized ($p = 0.004$). However, there was no significant difference in blood product administration between TEG and traditional coagulation panel during post-operative transfusions ($p = 0.351$).

Discussion

Use of a TEG directed algorithm for transfusion of blood products following CPB was associated with a reduction in patients being transfused during the intraoperative period. While evidence is mounting, further investigation is needed to improve support for use of TEG following CPB.

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Extraction of Omega-3 Fatty Acids From Shrimp

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Introduction

Because research suggested that shrimp contain high levels of omega-3s, we decided to test shrimp for various fatty acids - docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), and alpha-linolenic acid (ALA) - and compare the omega-3's in shrimp to other foods that were tested in the previous years.

Methods

After obtaining unfavorable results, we changed our shrimp vendors and extraction methods. While constants included the cooking process, solvent (methanol), extraction solution (hexane), and gas chromatograph (GC) settings, our variables were centrifuging extracted juices, using vials with different volumes for separation, letting the juice sit for an extended period of time, and testing varying sample sizes. All samples were analyzed using the GC.

Results

Our research indicated that we should have found omega-3s in the shrimp, but our Agilent 6850 GC testing shows no results. Promising GC results would show peaks of ALA, DHA, and EPA respectively at 14.295, 19.018, and 23.246 minutes. Our trials produced no matching peaks and no indication of omega-3s. Based on journal research, shrimp is known to be a good source of omega-3s. This reveals a fault in our method or in the shrimp we acquired.

Discussion

We were unable to obtain omega-3s from shrimp. However, since the standards showed a properly functioning GC and research indicated that shrimp contain omega-3s, the flaw is on either the shrimp or in our procedure. Further testing with procedural changes (e.g. alternative solvents) will attempt to identify what is preventing omega-3 peaks from appearing.

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Health Benefits of Omega-3 Fatty Acids

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Introduction

N-3 polyunsaturated omega-3 fatty acids have a wide range of health benefits. Given this, we focused our research on the effect of omega-3 fatty acids on heart and eye health. Through the reading of scientific publications, we hoped to gain understanding of the chemical pathways by which omega-3s impact physiology. We explored the effect of demographics on omega-3 consumption.

Methods

We utilized several online sources of scientific journals, with the main website sources being the National Center for Biochemistry Information, Proceedings of National Academy of Sciences (PNAS), University of Rochester, and National Eye Institution.

Results

Omega-3 fatty acids have anti-inflammatory properties that enable omega-3s to treat eye disorders such as vascularization and retinopathy. The properties of omega-3s are also useful for treating other inflammation diseases, such as age related macular degeneration and dry eye disease. Omega-3s provide heart benefits by preventing plaque buildup in the arteries and lowering blood pressure. Omega-3s treat arrhythmia by hyperpolarizing cardiomyocytes. Demographic research indicates that location affects the levels of omega-3 fatty acids in diets.

Discussion

Our research was based off of the idea that omega-3s were some miracle chemical capable of curing all ailments. Upon comparison of the US to other countries, Americans do not consume enough omega-3s. Omega-3s do have beneficial physiological effects, with common threads among journal publications stating the ability of omega-3s to improve heart and eye health due to its anti-inflammatory properties. We plan to look deeper into the mechanisms by which they provide these benefits.

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Normal Serum Lactate Values in Various Pediatric Populations: A Literature Review

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Wichita State University

Introduction

There are many causes for serum lactate to elevate, but literature and clinical practice predominantly focus on elevated lactate signifying sepsis or septic shock. Elevated lactate levels indicate tissue hypoperfusion in sepsis; an early diagnostic marker that guides treatment. Currently, accepted normal serum lactate levels in children are ages 0-90 days: 1.1-3.5 mmol/L, ages 3-24 months: 1.0-3.3 mmol/L, and ages 2-18 years: 1.0-2.4 mmol/L. Purpose: To investigate lactate values in various pediatric populations to determine if the accepted clinical lactate reference range accurately represents populations outside of the acutely ill child.

Methods

Utilization of Wichita State University SmartSearch tool that mines multiple databases including, but not limited to, Science Direct, CINAHL, MEDLINE, and Cochrane Library. Articles included between February 1, 1996 and November 1, 2017.

Results

Seventeen studies were identified and reviewed. Lactate values were elevated above normal in, exercising children, preterm infants, infants with low birth weight, and infants with trauma and hypoxia. Lactate levels in children with sepsis were not found to be globally elevated, but an elevated lactate in a child with a sepsis predicted a higher mortality.

Discussion

One range of normal lactate does not accurately represent all populations that are non-acutely ill. Lactate in various pediatric populations compared to a normal population was found to be elevated. Causes for elevated serum lactate levels are not well studied or recognized outside of an acutely ill population. When evaluating serum lactate values, there should be consideration for variation in lactate level in the non-acutely ill population.

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Presentation Type: Poster
Location: Sunflower

Normal Serum Lactate Values in Various Adult Populations: A Literature Review

Lindsey Carson, PA-S, Kendall Cole, PA-S, Rachel Eldersveld, PA-S, Sue Nyberg, MHS, PA-C

Wichita State University

Introduction

There are many causes for serum lactate to elevate, but literature and clinical practice predominantly focus on elevated lactate signifying sepsis or septic shock. Elevated lactate levels indicate tissue hypoperfusion in sepsis; an early diagnostic marker that guides treatment. Currently, a single range of values (0.5-2.2 mmol/L (venous) and 0.5-1.6 mmol/L (arterial)) is accepted as normal for the entire population. Purpose: To investigate lactate values in various populations to determine if the accepted clinical lactate reference range accurately represents populations outside of the acutely ill adult.

Methods

Utilization of Wichita State University SmartSearch tool that mines multiple databases including, but not limited to, Science Direct, CINAHL, MEDLINE, and Cochrane Library. Articles included between January 15, 1979 and November 1, 2017.

Results

Forty studies were identified and reviewed. It is well known that lactate levels are elevated in acutely ill populations, including sepsis and trauma. Lactate levels were also elevated in other, less studied, populations including exercising, gestational diabetes, transient loss of consciousness, and individuals with migraines. There were discrepancies within the laboring population.

Discussion

One range of normal lactate is not reliable; the clinical lactate reference range does not accurately represent populations that are not acutely ill. Lactate in various populations compared to a normal population was found to be elevated. Causes for elevated serum lactate levels are not well studied or recognized outside of an acutely ill population. When evaluating lactate values, there should be consideration for variation in lactate levels outside of the acutely ill population.

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Workplace Stress and Productivity: A Cross Sectional Study

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Introduction

The primary purpose of this study was to evaluate the association between stress and productivity in the work place.

Methods

A multi-site, cross-sectional study was conducted to survey employees across four organizations. Demographic information included sex, race, age group, marital status, and education level. Stress was measured by the Perceived Stress Scale (PSS) and productivity was measured by the Health and Work Questionnaire (HWQ), which included 6 subscales. Pearson correlations were conducted to measure the association between stress and productivity scores. T-tests evaluated differences in scores by demographic factors.

Results

A total of 186 participants responded to the survey, most of whom reported being white (94%), female (85%), married (80%), and having a college degree (74%). A significant inverse relationship was observed between the scores for PSS and HWQ, $r = -0.734$, $p < 0.001$; as stress increased, productivity appeared to decrease. Another notable inverse relationship was PSS with Work Satisfaction subscale, $r = -0.606$, $p < 0.001$. One significant difference was observed by demographic factor: males scored higher on the HWQ Supervisor Relations subscale compared to females, 8.4 (2.1) vs. 6.9 (2.7) respectively, $p = 0.005$.

Discussion

Scores from PSS and the HWQ appeared to be inversely correlated; higher stress scores were significantly associated with lower productivity scores. This negative association was observed for all HWQ subscales, but was especially strong for work satisfaction. This study also suggests that males may have better supervisor relations compared to females, although no gender differences were observed by perceived levels of stress.

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Celebrate Day 366: Evaluation of an Infant Mortality Awareness Event in Sedgwick County, Kansas

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Introduction

The Sisters and Brothers for Healthy Infants (SBHI) is a community-based initiative created to address the high rate of black infant mortality in Sedgwick County, KS. The initiative focuses on three phases: Celebrate Day 366, followed by intense community intervention to target families in zip codes impacted by infant mortality, and a community wide social media campaign. The purpose of this presentation is to highlight the evaluation of the Celebrate Day 366 event.

Methods

Participants: SBHI planning committee participants were recruited from local graduate chapter organizations of Historically black Greek Fraternities and Sororities. Community participants were recruited through word of mouth, fliers, social media, churches, daycares, salons, and barbershops. **Procedure:** Participants attended a one-day community empowerment workshop where they received information on fatherhood, stress, health and well-being, and infant mortality awareness. Survey responses were analyzed with descriptive statistics.

Results

Over 50 people attended the Celebrate Day 366 event and 24 people responded to the satisfaction survey. Overall, 100% of respondents were satisfied and felt the event had a positive impact on their well-being. Ninety-one percent indicated they would share the information learned with others. Sixty-five percent felt they increased their knowledge on available prenatal resources within the community.

Discussion

The Celebrate Day 366 event was successful in highlighting the issue of infant mortality in the community, increasing awareness of prenatal resources, and increasing community participation around this issue. More in-depth analysis is needed to say what impact this event and future events will have on future attendees.

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Young Adults' Performance of Unipedal Dynamic Balance with Various Footwear Conditions

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Introduction

Only one study has evaluated how wearing Vibram FiveFingers® (VFFs) barefoot shoes affects static balance compared to athletic shoes and barefoot. No research reports on dynamic balance with the same footwear. We examined dynamic balance when subjects were barefoot, wearing (VFFs), or wearing shoes and using a modified Star Excursion Balance Test (SEBT) and a timed test using the SEBT grid. The modified SEBT uses only 3 spokes of an eight-spoke wheel to measure lower extremity reach. Timed performance used all spokes, touched in successive order in clockwise and counterclockwise directions.

Methods

Thirty adults, aged 18-30 years, had no experience wearing barefoot style shoes, any significant injuries/ surgeries within the last 12 months, current injury or illness, pregnancy, or any cardiac, musculoskeletal, or neurological illness. Subjects performed a modified SEBT and a timed test using the SEBT grid with VFF barefoot-style shoes, their own shoes, and barefoot in a randomized order. The right leg was the stance leg. A repeated measures analysis of variance compared the three footwear conditions for reach in three directions and timed test completion (in seconds).

Results

Subjects reached farther anteriorly in shoes than in VFFs and barefoot and reached farther posterolaterally in shoes than barefoot. Type of footwear did not affect timed tests: the fastest average time occurred when the subject wore shoes.

Discussion

Results suggest that VFFs may mimic going barefoot while performing unipedal dynamic balance activities. VFFs may be used as an adjunct or substitute for performing balance activities barefoot in this population.

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The Risk of Recreational Trampoline Use in the Pediatric Population: A Retrospective Study

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Introduction

Indoor recreational trampoline parks are increasing in number across the US and with this trend has come an increase in trampoline related injuries. Extensive research has been conducted dating back to the introduction of trampolines; however, with the emergence of trampoline parks, few studies have been done to evaluate the risk to the pediatric population in this new setting. **PURPOSE:** The purpose of this study is to provide insight into the risks of trampoline parks and home trampolines by identifying common injuries associated with recreational trampoline use in the pediatric population.

Methods

A retrospective medical record review of pediatric patients presenting to one urban emergency department from October 1, 2015 to December 31, 2016, was completed. Extracted information included weight, height, sex, mechanism of injury, type of injury, location of trampoline, disposition of care, diagnostic studies used, and treatment required.

Results

Of the 173 children seen in the ED for trampoline-related injuries that met the inclusion criteria, 46% suffered a fracture, 15% required procedural sedation and/or surgery, and 65% required follow-up care with a primary care physician or orthopaedic surgeon. The most common injuries occurred in the lower extremity with 17% of all visits involving treatment for a fracture of the tibia.

Discussion

The data collected emphasizes the risk to children with recreational trampoline use. It may assist in improving regulations and safety protocols at trampoline parks and help healthcare providers guide parents on safety issues of trampoline parks and home trampolines.

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Study Design: Research
Presentation Type: Poster
Location: Meadowlark

A Retrospective Cohort Study: Judicious Use of Empiric Vancomycin (EV) in Pediatric Febrile Neutropenia Pre- and Post-2010 IDSA Guidelines at Wesley Children's Hospital (WCH) - Uptake of Clinical Practice Guidelines in a University-Affiliated Community Hospital

Sanya Thomas, M.D., Robert Wittler, M.D., Matt Engel, MPH, Carolyn Ahlers-Schmidt, Ph.D.

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Introduction

Infectious Diseases Society of America (IDSA) guidelines for antibiotic management of febrile neutropenia (FN), revised in 2010, discourages initiation of empiric vancomycin (EV) unless several clinical indications warrant it. This study evaluates the judicious use of EV before and after the 2010 guidelines in pediatric cancer patients with FN at the Wesley Children's Hospital (WCH).

Methods

A retrospective chart review was performed on FN patients admitted to WCH, ages 2-20 years, over a 3-year course each, pre- (n=73) and post- 2010 (n=160) omitting a 2-year clinical guideline uptake period (January 2010 to December 2011). Categorical variables were analyzed by Chi square and continuous variables by T-test.

Results

Four blood cultures from the pre-cohort and six blood cultures from the post-cohort grew *S. aureus*. One of the four from the pre-cohort grew MRSA. EV use was lower in the post-cohort group by 9% ($p = 0.031$). Number of days of EV use was lower in post-cohort group by 2.5 days ($p = 0.000$). Further, EV use was limited to less than 2 days only in 14% of patients in pre-cohort compared to 69% in post-cohort ($p = 0.000$).

Discussion

Improvement in length and frequency of use of EV was noted in the post-cohort group. However, there was still considerable EV use in the post-cohort group when not clinically indicated. In the era of antibiotic stewardship, this study highlights the need for quality improvement projects to better align our practice at WCH with current clinical practice in pediatric FN.

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Implementation of the Breastfeeding-Friendly Provider's Office Protocol: A Pilot Study at a Private Obstetrical Clinic

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Introduction

Extended breastfeeding rates among all demographics remain lower than national recommendations. The overall objective of this study, was to pilot the implementation of the 'Breastfeeding-Friendly Provider's Office Protocol' at a private obstetrical clinic, and to examine the impact on breastfeeding outcomes.

Methods

Components of the Academy of Breastfeeding Medicine (ABM) Breastfeeding-Friendly Provider's Office Protocol were implemented to support environmental changes, clinical implementation, and societal influences. The intervention included: adopting a breastfeeding friendly office policy, displaying positive images of breastfeeding and signs of support, standardizing breastfeeding education, and providing a breast pump prescription during prenatal care. Outcomes assessed include breastfeeding rates prior to and after implementation of the protocol. Patients were invited to complete electronic surveys regarding breastfeeding support after attending the six week postpartum visit.

Results

Maternal preference for exclusive breastfeeding increased from 71.9% to 86%. Breastfeeding at hospital discharge increased from 74.7% to 84.8%, and at the six week postpartum visit increased from 88.2% to 100%. During the intervention, most patients received education packets (82.8%, 106/128) and breastfeeding pump prescriptions (84.4%, 107/128). Of 26 postpartum survey respondents, average age of infant was 9.8 weeks, and 84.6% (n=22) patients were still breastfeeding. Three patients (11.5%) reported wanting more breastfeeding information.

Discussion

Implementing a Breastfeeding-Friendly Provider's Office Protocol at a private obstetrical clinic improved maternal preference for exclusive breastfeeding, breastfeeding at hospital discharge, and breastfeeding six weeks postpartum. There continues to be a desire for more breastfeeding information during the postpartum period.

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Patients with Diabetes Mellitus Managed with Insulin Detemir During Pregnancy: Hospital Outcomes

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Introduction

Approximately 70% of pregnancies are complicated by diabetes mellitus (ACOG PB 190). Due to a greater prevalence of obesity and sedentary lifestyle, the prevalence of diabetes is increasing globally. The aim of this study is to evaluate hospital outcomes of patients with diabetes mellitus managed with insulin detemir during pregnancy.

Methods

We retrospectively reviewed all patients managed with insulin detemir at a single maternal fetal medicine clinic. Patients included in the study delivered between January 1, 2007 and August 31, 2016 at Wesley Healthcare. Patients were excluded if pregnant with a neonate not expected to survive, and if hospital stay was beyond 21 days.

Results

Of 161 patients, 154 were included in the final analysis. The majority of patients had gestational diabetes (75.3%, n=116). Average maternal age at delivery was 31.0 ± 5.4 years old (range: 19-43). Most patients were white (73.4%, 113/150). Sixty-six were obese at the initial appointment (42.9%). Twenty-six (16.9%) patients had pregnancy-induced hypertension. Average hospital stay was 2.6 ± 1.2 days (range: 1-8). Half of patients delivered via cesarean (51.3%, n=79). Average neonatal weight was 3.3 ± 0.6 kilograms (range: 1.3-5.0). APGAR scores were 8 at 1 minute (54.4%, 74/136), and 9 at 5 minutes (78.5%, 117/136). Average neonatal glucose was 62.3 ± 14.0 mg/dL (range: 37-107). Average maternal glucose during the hospital stay was 109.2 ± 22.6 mg/dL (range: 67.3-184). Six (3.9%) patients received regular insulin treatment during their hospital stay.

Discussion

Among patients treated with insulin detemir during pregnancy, few patients required supplemental insulin treatment during the hospital stay for delivery. Neonatal outcomes were satisfactory.

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Contribution of the Biofire Filmarray Meningitis/Encephalitis Panel: Assessing Antimicrobial Duration and Length of Stay

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Introduction

Traditional evaluation of meningitis includes cerebrospinal fluid (CSF) culture and gram stain to pinpoint specific causal organisms. The BioFire FilmArray Meningitis/Encephalitis Panel has been implemented as a more timely evaluation method. This study sought to assess if the BioFire ME Panel was associated with a decreased length of stay or decreased antimicrobial duration when used in the diagnosis of meningitis or encephalitis.

Methods

A retrospective chart review was performed on patients admitted to Via Christ Hospitals with suspected meningitis during the year prior to and after the BioFire ME Panel implementation. Length of hospital stay, duration of antimicrobials, and BioFire ME Panel result were gathered and analyzed utilizing a Mann-Whitney U test.

Results

The mean (median) duration of antimicrobials in the year prior to and after the BioFire ME Panel implementation was 3.6 (3) and 3.2 (2) days, respectively ($p=.835$). The mean (median) length of stay in the year prior to and after the BioFire ME Panel implementation was 5.8 (4) and 5.4 (4) days, respectively ($p=.941$). Among the patients admitted after the implementation of the BioFire ME Panel, 4.3 % ($n=2$) had a positive bacterial result, 38.3% ($n=18$) had a positive viral result, and 57.4% ($n=27$) had a negative result. Of the 27 negative results, 77.8% (21) were treated with antimicrobial medication.

Discussion

This study suggests there is no difference between length of stay or antimicrobial duration in presumed meningitis cases assessed with traditional methods as compared to the BioFire ME Panel.

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The Birth of a Teen Pregnancy Alternative: Design and Implementation of a School-Based Prenatal Clinic

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Introduction

Kansas is ranked 18th nationally for infant mortality and Wyandotte County, KS has the highest infant mortality for African Americans (12.9/1,000) in the nation and among the highest overall teen pregnancy rates (73/1,000) in the state ('County Health Rankings', 2016). A disproportionate number of both infant deaths and teen pregnancies occur to African American and Latino youth('Infant Mortality Rate', 2016).

Methods

To address these health disparities, the University of Kansas Medical Center, in partnership with the local health department and the school district, initiated school based health clinics at two high schools where teen pregnancy in each school in 2011 was reported to be ~50 youth, with other cases uncounted because of school dropout subsequent to pregnancy. Students self-refer, are referred by the school nurse/counselors, or are identified by the health department. Organizational partners share in the costs of care. Weekly clinic includes medical students, supervising physicians, case managers and social workers who facilitate curriculum as well as provide prenatal services.

Results

The clinic has served 21 patients (12 mo.) with 10 deliveries (6 mo.). Examples of outcomes tracked include age (enrollment/at delivery), intensity of prenatal care, infant outcomes referral services required (i.e., behavioral health services).

Discussion

Ongoing challenges include school attendance, homelessness, food insecurity, language/culture, learning challenges and limitations of on-campus services.

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Approaching End of Life Discussions with Older Adult Trauma Patients

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Introduction

Older adult trauma patients have higher morbidity and mortality than virtually all other populations with traumatic injuries and mechanisms. Within 3 years of hospital discharge, 16% of older adult trauma patients die; 10% dying within the first year. Regarding end of life discussions, barriers exist which impacts the delivery of an accurate prognosis. A barrier commonly expressed is the provider's fear to not knowing the best way to deliver the information regarding prognosis.

Methods

Literature review: Geriatric trauma patients and their families were the literary review population. Data analyzed from: AAFP, Health Team Leaders, Journal of Trauma and Acute Care, and UpToDate

Results

A practical approach to discussing end of life is having providers prioritize, practice and prepare beforehand, deliver information in an appropriate environment, and assess understanding. A systematic approach to the discussion includes ask, wait, listen, and ask. Models exist to help providers work with patients and families in making healthcare decisions: the paternalistic model, the informative model, and the interpretive model.

Discussion

The discussion regarding end of life care should also cover end of life options including advanced directives, palliative care, and care location. Providers must assess patient state, communicate with the patient and family, adjust to cultural and personal preferences, and assist in determining the best plan for end of life care. Special vigilance must be taken when dealing with end of life situations in cases of trauma, as answers and options become increasingly difficult with the degree of trauma and age of the patient.

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Long-Term Outcomes of a Rural Assured Admissions Program

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Introduction

The Scholars in Rural Health program is designed to attract young premedical rural Kansans with a high probability of successful careers in rural communities. The anticipated outcome is an increase in students from Kansas rural communities who choose to practice in rural Kansas. After 21 years, some program participants have changed their initial practice locations. This project reports on the practice location shifts and asked the question, 'Do Scholars in Rural Health participants stay in rural communities long term?'

Methods

A retrospective review of all administrative Scholars program data was completed. The project dataset included practice locations categorized as (1) Kansas or Out of State, (2) rural, metropolitan, urban, or academic setting, and (3) primary care or non-primary care.

Results

Since 1997, 70 Scholars in Primary Care or Scholars in Rural Health program completed their medical education through residency or fellowship. Forty-nine of the 70 Scholars (70%) practice a primary care specialty (family medicine, general internal medicine, pediatrics). A shift was observed away from a rural practice over time for primary care physicians to an urban academic practice or an urban out of state practice. Smaller shifts were seen for non-primary care physicians, most notably, for those who returned to Kansas.

Discussion

The Scholars in Rural Health program has a good record of attracting candidates who initially practice in rural communities. Over time, however, some Scholars shift toward academic and urban practices. These results reflect the need to find the proper incentives to retain physicians in rural communities.

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Perceptions Among Family Medicine Residents Regarding the Quantity, Quality, and Effectiveness of Their Training in Diagnosing and Treating Mental Disorders: A Survey Study

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Introduction

Untreated mental disorders are surpassing other medical conditions regarding mortality and burden of disease. With the increasing burden of mental disorders, it is estimated that primary care physicians provide approximately 50% of mental health care in the United States. Despite this, family medicine residencies have struggled to equip physicians with the comprehensive tools necessary to manage mental disorders.

Methods

The aim of this study is to assess family medicine residents' perceptions of their education in psychiatry. A survey was created and sent to all the program coordinators of family medicine residencies in the United States, who then forwarded the survey to their residents. Survey questions assessed resident education, knowledge, attitudes, and barriers regarding training in psychiatry. The KUMC IRB approved the study and its design.

Results

Current data suggests 96% of residents said they would like more training in psychiatry, and 43% of residency programs have less than 2 weeks on a psychiatry rotation. In both ambulatory and inpatient settings, 58% of the training in psychiatry is done by family medicine physicians as opposed to psychiatrists. The largest barrier to adequate training in psychiatry was lack of time (20%), lack of psychiatric faculty (21%) and competing demands (22%).

Discussion

This dearth of training leads residents to have low confidence in their ability to adequately diagnose and treat mental disorders. We hope that by identifying this educational gap, family medicine residency programs will modify their curricula to allow for additional training in psychiatry.

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Medical Student and Resident Perceptions Regarding a Mentoring Program During the Obstetrics and Gynecology Clerkship: Challenges 3 Years Later

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Introduction

A medical student mentoring program (MSMP) established in 2013 pairs medical students completing the KUSM-W Obstetrics and Gynecology (Ob/Gyn) clerkship with Ob/Gyn residents. One resident is assigned 1-2 students per six-week rotation. In 2015, mandatory meetings were eliminated and resident participation became voluntary. This study reports feedback from medical students and resident physicians regarding a MSMP.

Methods

Third and fourth year medical students and Ob/Gyn residents were invited to complete online surveys regarding the mentoring program. Surveys were collected over 4 weeks.

Results

Forty-seven medical students and 11 residents participated in this study. The majority of students reported meeting mentors 1-2 times (67.3%, 31 of 46) and agreed it was the correct frequency. About half agreed meetings were helpful (56.9%, 25 of 44). The majority agreed their mentor was approachable (82.6% 38 of 46) and that they had a good mentoring relationship (71.1%, 32 of 45). Satisfaction with the MSMP overall varied, and students reported feedback was generic or not actionable for improvement. Many residents (63.6%, n=7) reported not receiving mentoring training, although four desired training (57.1%). Most residents (81.8%, n=9) met mentees 1-2 times, and two (18.2%, n=2) reported meetings were not helpful to the mentee. All residents agreed they had good mentoring relationships, and were likely to continue mentoring.

Discussion

Despite infrequent meetings, most students and residents continue to report good mentoring relationships. Clerkships considering an MSMP should develop a half-day workshop to teach residents how to provide actionable feedback, engage students, and use mentoring meetings advantageously.

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Are uWise? Using APGO uWise Modules to Improve the Obstetrics and Gynecology Midterm

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Introduction

In a 2015 survey, medical students rated feedback received during this clerkship as average, with the midterm being the lowest rated category. Focus groups revealed students did not think the midterm aligned with clerkship lectures, nor was it helpful in preparing for the shelf exam. The midterm was changed to address these concerns by having the clerkship director select a bank of APGO uWise modules corresponding with lectures. The midterm comprised of 5-8 modules. This study investigated medical student perceptions of the KUSM-W Obstetrics and Gynecology clerkship midterm after implementing use of the uWise modules.

Methods

Third and fourth year medical students were invited to complete a survey regarding feedback received during the clerkship and the midterm. Students were categorized into two groups: original midterm and uWise midterm. Surveys were collected over 4 weeks.

Results

Students receiving the uWise midterm rated the quality of feedback worse for all feedback categories, but alignment with lectures and representativeness of the shelf exam better than the group receiving the old midterm. There was a significant difference in ratings for preparedness for the midterm between the uWise (M=3.45, SD=0.60) and original midterm (M=2.88, SD=0.68) groups, $t(44)=3.06$, $p = 0.004$.

Discussion

Survey findings indicate changes made to the midterm are effective in addressing student concerns from our previous study. Student feedback is critical to development of clerkship curriculum. As such, all students receiving the new midterm will be asked to complete the survey to ensure the results are not limited to this academic year.

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Presentation Type: Poster
Location: Meadowlark

Transgender Health Medical Education Intervention and Its Effects on Attitudes, Comfort, Knowledge, and Beliefs

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Introduction

Transgender health disparities have been well documented in the literature in recent years, as well as the lack of transgender health issues in medical education programs across the country.

Methods

This study was a prospective quality improvement interventional study with an hour long didactic lecture on transgender health being given to faculty, medical students, and residents at the University of Kansas School of Medicine-Wichita. The didactic lecture included educational information and presentations by transgender persons. A pre-intervention and post-intervention survey was given to assess attitudes, comfort levels, knowledge, and beliefs on transgender health issues, as well as a post 90 day survey assessing the same variables.

Results

The intervention provided a significant increase in attitudes, comfort levels, and knowledge with respect to trans health issues between the pre- and post-intervention surveys, however did not provide a significant increase in beliefs on trans health issues. There was no significant change in attitude, comfort levels, knowledge, or beliefs from the post-survey after 90 days.

Discussion

A didactic lecture on transgender health issues can significantly change attitudes, comfort levels, and knowledge on transgender health issues with the changes sustaining after 90 days.

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Enhancing Splinting Competency and Confidence Through Inter-Residency Education

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Problem

Orthopaedic injuries are a common reason for patients to seek medical care with approximately 15% of the population initially presenting to primary care physicians (PCP) each year (1,2). The initial treatment for most injuries is splinting. Unfortunately, less than 1/3 of PCPs receive formal musculoskeletal training leading to impaired competency and confidence (3). Suboptimal splints can lead to complications such as skin breakdown in 6% of cases (4), worsening of deformity, and increased pain. The goal of our initiative was to improve the competency and confidence of splint application in Family Medicine Residents.

Baseline

N/A

Design

Orthopaedic residents held a splinting workshop for Family Medicine Residents (34 residents). Twenty minutes was spent on didactic instruction addressing knowledge. Skills were then addressed by spending 10 minutes per station applying four types of splints: sugar tong, short leg, ulnar gutter, and thumb spica. Pre/post surveys were administered to assess basic knowledge and confidence in applying three common splints from 1-10 on a Likert scale. The data was analyzed using students' T test.

Results

Confidence in applying and molding each splint type improved significantly ($p < 0.001$). Mean confidence per Likert scale increased by 5.30, 5.29 and 5.19 on the sugar tong, long arm and short leg splint, respectively. Subjective feedback of the workshop was highly positive.

Conclusion

Education can increase competency and confidence in splint application. More investigation is needed in objectively measuring splinting proficiency and frequency of education needed to maintain high confidence levels. Furthermore, translational data is needed linking increases in splinting competency to a decrease in complication rate.

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Unilateral Hemichorea as a Presenting Feature of Tourette Syndrome in Adults

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Introduction

Tourette Syndrome is a childhood disorder characterized by vocal and motor tics, often with associated psychiatric comorbidities and compulsory behaviors. Few cases have been described in children of Tourette Syndrome presenting with hemiparesis, with no mention of unilateral hemichorea as a presenting symptoms in adults.

Methods

A 35 year-old male with bipolar disorder presented to his primary care physician with chronic right-sided headaches, memory deficits, slurred speech, vision changes, disorientation, left-sided facial paralysis, and left-sided hemichorea of the upper and lower extremities. He was admitted to a local hospital for further evaluation. MRI revealed atrophy of the right putamen and caudate nucleus. Testing for Huntington's disease, Paraneoplastic Syndromes, HIV, Syphilis, Antiphospholipid Syndrome, and substance abuse were all negative. Results of testing for parathyroid hormone, thyroid function, tumor markers, ceruloplasmin, and ferritin were all within normal limits. The patient was referred to Neurology for additional workup. Upon further investigation, the patient endorses a lifetime of increased abnormal movements and attention deficits. The patient was diagnosed with Tourette Syndrome and started on Clonidine.

Discussion

The neurobiological pathways driving Tourette Syndrome are complex and not fully understood. One predominating hypothesis attributes disease development to structural abnormalities in the basal ganglia. Studies have shown unilateral caudate atrophy to be associated with more severe symptoms persisting into adulthood. This case supports current theories of caudate nucleus atrophy in the pathophysiology of Tourette Syndrome and illustrates the presentation of unilateral hemichorea as a as a diagnostic component of the disease in adulthood.

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Left Ventricular Papillary Fibroelastoma

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Introduction

Cardiac papillary fibroelastomas (CPF) are the second most common benign cardiac tumors following atrial myxomas. Though the prevalence of CPF remains unknown, the incidence of CPF, diagnosed most often due to incidental findings on echocardiography, is increasing. We present the case of an incidentally discovered left ventricular CPF during a routine cardiovascular investigation.

Methods

A 75-year-old Caucasian woman with a past medical history significant for hypertension, dyslipidemia, and depression underwent transthoracic echocardiogram (TTE) due to her elevated risk for heart disease. TTE revealed an incidental left ventricular mass. Transesophageal echocardiogram (TEE) followed, revealing a large 1.9cm globular mass attached to the chordae tendinae of the anterior mitral leaflet. The very echo dense core differentiated the mass from vegetation or thrombi. She was asymptomatic at time of incidental discovery but underwent elective surgical resection due to the risk of stroke, myocardial infarction, peripheral embolism and sudden death. The resected mass was flushed in appearance, rubbery to spongy in texture, and measured 1.7 x 1.1 x 0.4 cm in size. Macroscopically, it was presumed to be a myxoma. Histologic examination revealed narrow, elongated, and branching papillary fronds composed of central avascular collagen and variable elastic tissue surrounded by acid mucopolysaccharide and lined by hyperplastic endothelial cells, thus confirming the diagnosis of cardiac papillary fibroelastoma.

Discussion

Cardiac papillary fibroelastoma is a rare diagnosis and macroscopically may be mistaken for myxoma. Histologic examination is necessary to make the correct diagnosis. Chance of recurrence after resection appears to be low with no significant data.

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Mycotic Aneurysm Mimicking Back Pain

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Introduction

Back pain is an extremely common chief complaint with most cases diagnosed as musculoskeletal source, however the differential diagnosis is very broad. Proper evaluation is crucial to identify rare cases of serious underlying pathology.

Methods

The patient presented to the ER with acute onset of bilateral hip pain, left leg weakness, and dysarthria. Physical exam demonstrated inability to bear weight on hips with sacral tenderness and decreased strength in his lower extremities. Laboratory tests revealed leukocytosis with elevated creatinine. Upon admission the patient was also found to be septic with concerns for osteomyelitis/discitis. An MRI of the lumbar spine was subsequently obtained which revealed an infrarenal mycotic aneurysm and a left psoas abscess causing reactive inflammation of the lumbar spine. Shortly afterwards the patient became more lethargic with increasing pain. The situation was discussed with the family and a decision was made for comfort care in congruence with the patient's wishes.

Discussion

In medicine it's easy to develop tunnel vision and focus on a narrow differential. This case highlights the importance of evaluating the entirety of the imaging and not focusing only on the area of chief complaint.

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Percutaneous Closure of Aorto-Right Ventricular Fistula and Ventricular Septal Defect,
Following Transcatheter Aortic Valve Replacement

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Introduction

Transcatheter aortic valve replacement (TAVR) is useful in high risk patients with severe aortic stenosis. A rare complication of this procedure is the occurrence of aorto-intra-cardiac shunts.

Methods

An 82-year-old male presented with exertional dyspnea, weight gain and bilateral edema one month after a trans-catheter aortic valve repair. On examination he was hypoxemic with an elevated jugular venous distension, an S3 heart sound and grade 2 holo-systolic murmur at the left sternal border. Auscultation of lungs revealed crackles at the bases. A TTE revealed a trace para-valvular leak, a right coronary sinus to right ventricular fistulae with continuous left to right shunting with a pulmonary to systemic flow fraction ($Q_p : Q_s$) of 1.6:1 and a peak velocity of 5.7 meters per second. Repair was done under transesophageal echocardiogram and fluoroscopic guidance. A 10-mm ventricular septal defect Amplatzer occluder, Abbott®, was deployed and locked the ventricular septal defect and elongated to close the aorto-ventricular fistula behind the stent frame of the bio-prosthetic valve. Intraoperative TEE revealed no further diastolic flow, and there was significant decrease in the ventricular septal defect with a QP: QS of 1.19:1.

Discussion

Left to right ventricular shunts with gradients greater than 1.5:1 should be considered for repair. Post TAVR shunts arise due to heavy calcifications leading to erosion of prosthetic valve. Since these patients are at increased surgical risks, this case illustrates that percutaneous repair using transcatheter approach is a viable alternative.

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Cardiovascular Hemodynamics in Patients with Lower Extremity Edema

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Introduction

We aimed to study hemodynamic profiles obtained using right and left heart catheterization to evaluate the prevalence of heart failure (HF) and pulmonary hypertension (PHTN) and their association with bilateral lower extremity edema (BLEE).

Methods

We studied individuals from the Coronary Artery Surgery Study (CASS) who underwent bilateral cardiac catheterization and a physical exam within 24 hours. BLEE was diagnosed as pitting edema on physical examination. Congestion was defined as a left ventricular end diastolic pressure (LVEDP) ≥ 15 mmHg. Among patients with congestion, HF was stratified using ventriculogram into reduced ejection fraction (EF) (EF $< 50\%$; HFrEF) and preserved EF (EF $\geq 50\%$; HFpEF). PHTN was defined as mean pulmonary artery pressure (PAP) ≥ 25 mmHg. The association between hemodynamic parameters (EF, mean PAP, diastolic PAP, LVEDP) and BLEE was examined using logistic regression adjusted for demographics (age, sex, race) and cardiovascular risk factors (smoking, prior myocardial infarction).

Results

Among 2877 patients, 46 had BLEE with mean age 59 years, 63% men, 96% white, and mean BMI 28. Hemodynamic profiles of the patients with BLEE were: HFrEF 70%, HFpEF 20%, PHTN with HF 57%, isolated PHTN 0%, and normal 11%. In HFrEF and HFpEF, 77% and 100% had congestion respectively. The only hemodynamic abnormality independently associated with BLEE was mean PAP (adjusted odds ratio: 0.90, 95% CI 0.88 to 0.93).

Discussion

Among patients with BLEE, the most common hemodynamic profile was HFrEF with PHTN and congestion. Mean PAP was the only independently significant predictor of BLEE.

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Electroencephalography Feature Classification Using Neural Network Algorithm for Brain-Machine Interface with Robotic Hands

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Introduction

Implementation of Brain-Machine Interface (BMI) technology has the potential to assist in activities of daily living for individuals with physical disabilities. By acquiring electroencephalogram (EEG) signals, manipulation commands for real-time control of assistive devices can be generated from the changes in the brain signals related to hand movements.

Methods

This project included both cognitive neuroscience and brain-machine interface studies. EEG signals were recorded for actual and imaginary tasks and signals were classified by training artificial neural network algorithms. The experiment utilizes a 16-channel EEG system from g.tec to acquire real-time signals from human scalp in Simulink at a sampling rate of 256 samples/second. Ten human subjects between ages of 18 to 52 were recruited to perform both studies associated with human hand movements. Using Hjorth parameters, sixteen features were extracted from three EEG electrodes (C3, FCz, C4) from imagined movements of left and right hands.

Results

Once extracted, features were classified, with 95% accuracy, to four robotic states using a feedforward pattern recognition neural network algorithm.

Discussion

Real-time implementation of the trained neural network can be developed to create a BMI model to control two robotic hands.

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Patient-Centered Care of Diabetes: A Case Study of Family Residency Clinical Practice

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Introduction

In diabetes treatment, a collaborative patient-physician relationship is more likely to be associated with control of glucose through patient adherence to a medication regimen, dietary changes and regular follow-up visits.

Methods

A representative sample of 23 residents was interviewed at Via Christi Hospitals and Wesley Medical Center family medicine residency clinics. Eight first year, 7 second year and 8 third year residents were interviewed; 12 women and 11 men. In addition to questions about diabetes care, residents participated in one of five randomly selected patient role plays. Each scenario presented a patient whose diabetes was not well-controlled. Audio recordings of each interview and role play were transcribed and coded. The study was approved on May 23, 2017 by the institutional review boards of Wichita Medical Research & Education Foundation and Via Christi Hospitals Wichita.

Results

On average, residents reported one in four patients they treated in the past week had been diagnosed with diabetes; among half of these patients diabetes was uncontrolled. In the role play, there was evidence of patient-centered practice. For the patient making changes in diet and exercise, there was consistent praise. For the patient who had difficulty remembering to take medication, there were many practical suggestions.

Discussion

Residents expressed a better appreciation of the social dimension of care and empathy for patients feeling overwhelmed. Several discussed the challenge of managing insulin, particularly among patients with type 1. Learning more about diabetes treatment from an endocrinologist and/or diabetes educator were suggested.

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