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Intestinal Perforation and Prolapse Due to Jejunostomy: Case Report

By Rafaela Martins Togneri, Felipe Poubel Timm do Carmo & Maurício Carvalho Guerra

Abstract- *Objective:* Report the case of a patient who presented complications due to incorrect handling of the tube during jejunostomy, in order to demonstrate data that corroborate the importance of proper management. Case

Detail: A 60-year-old male patient with jejunostomy was admitted to the emergency department presenting prolapse. He underwent urgent laparotomy, which revealed jejunal loop perforations and Foley tube cuff hyperinflation with food content. Was performed reduction of the jejunal prolapse, removal of the tube after perforation and cuff emptying, as well as two-plane enterorraphy at the perforation sites and Stamm-Senn gastrostomy were performed.

Final considerations: It can be observed that complications are relatively infrequent, but they cannot be disregarded, and the attending physician should emphasize the importance of proper management of jejunostomies by the caregivers in order to avoid such complications.

Keywords: *jejunostomy, intestinal perforation, prolapsed.*

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Intestinal Perforation and Prolapse Due to Jejunostomy: Case Report

Rafaela Martins Togneri [α], Felipe Poubel Timm do Carmo [σ] & Maurício Carvalho Guerra [ρ]

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I. Introdução

O jejuno corresponde à segunda porção do intestino delgado, compreendendo 40% de sua extensão e sua função fundamental é a absorção de água e nutrientes, sobretudo aminoácidos e nutrientes lipofílicos (Müller, 2012/13). A jejunostomia é um procedimento cirúrgico no qual a luz jejunal comunica-se com a parede abdominal, seja por meio de uma sonda que é inserida na luz do jejuno proximal, com objetivo principal de promover a nutrição do paciente, bem como administrar medicamentos e por vezes aspirar conteúdos intestinais (Tapia, Murguia, Garcia, Monteros, & Oñate, 1999), ou por fixação direta deste segmento do intestino à parede abdominal, com intuito de descomprimir o trato digestivo. (Santos et al., 2011). A principal indicação para uma jejunostomia é como um procedimento adicional a uma cirurgia de grande porte do trato digestivo superior, em que se espera longo período de jejum ou complicações no período pós-operatório, e a dieta pode ser infundida diretamente ao nível do jejuno precocemente. Também é utilizada em pacientes em estado hipercatabólico, tal como aqueles com sepse, vítimas de trauma, com neoplasia maligna irressecável ou aqueles que posteriormente à ressecção cirúrgica da neoplasia necessitarão de quimioterapia e/ou radioterapia (Gama-Rodrigues, Del Grande, & Martinez, 2004; Tapia et al., 1999). As complicações decorrentes de tal procedimento são diversas, podendo ser graves e até fatais, e são classificadas em mecânicas, infecciosas, metabólicas e gastrointestinais, cuja frequência varia entre 2% a 65% (Medina-Franco, Pestaña-Fonseca, Rosales-Murillo, Staufert-Gutiérrez, & Velázquez-Dohorn, 2013).

Segundo um estudo realizado por Han-Geurts, Verhoef e Tilanus (2004), de 1.387 pacientes submetidos à ressecção esofágica, 1.166 (84%) receberam jejunostomia sob a técnica agulha-cateter. O cateter de jejunostomia foi colocado sem complicações e o protocolo de nutrição enteral foi tolerado por todos os pacientes. No total, houve 571 complicações cirúrgicas em 422 pacientes, das quais, treze foram relacionadas ao cateter (1,1%) todas com necessidade de relaparotomia. Em um paciente houve torção do cateter de jejunostomia, o qual foi retirado e substituído por outro, que infelizmente obstruiu 3 dias depois. Em 3 pacientes, ocorreu uma hérnia do intestino delgado por trás da jejunostomia. Em 4 pacientes houve desalojamento completo do cateter de jejunostomia, o que resultou em vazamento intraperitoneal em 3 deles. Todos os 4 pacientes foram reoperados e receberam uma nova jejunostomia. O vazamento intraperitoneal do conteúdo enteral sem desalojamento do cateter ocorreu cinco vezes. No total, a taxa de mortalidade foi de 3,1%. Foram cinco mortes (0,4%) como consequência direta da jejunostomia e complicações relacionadas (Han-Geurts et al., 2004).

Este trabalho visa alertar quanto aos devidos cuidados no manejo das jejunostomias e às possíveis complicações decorrentes de sua manipulação incorreta, a partir da demonstração dos dados do relato de caso abordado.

II. Detalhamento Do Caso

Paciente masculino de 60 anos, com diagnóstico de carcinoma espinocelular de esôfago distal, estadio III A, com proposta terapêutica inicial de quimioterapia e radioterapia exclusivas. Foi submetido a jejunostomia por laparotomia, sob a técnica de Stamm, para suporte nutricional durante o tratamento. Após o término do tratamento inicialmente proposto, foi observado em exames de seguimento que a lesão neoplásica havia progredido, sendo, então, iniciada a

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quimioterapia paliativa exclusiva. O paciente Foi atendido pelo serviço de emergência em um hospital do Espírito Santo, em Vitória-ES, onze meses após o procedimento cirúrgico, apresentando prolapso de jejunostomia que teve início há 3 dias (Fig.1). O mesmo não apresentava dor abdominal, vômitos ou qualquer outro sinal ou sintoma. Os exames laboratoriais na admissão evidenciaram leucocitose com 17.320 células/mm^3, com desvio à esquerda (40% de bastões) e proteína C reativa de 54,4mg/L (Para valores de referência: Leucócitos entre 4.000 e 12.000 células/mm^3; Bastões entre 1 a 5%; Proteína C reativa <5 mg/L). Não foram realizados exames de imagem, sendo o paciente prontamente submetido à laparotomia exploradora de urgência.

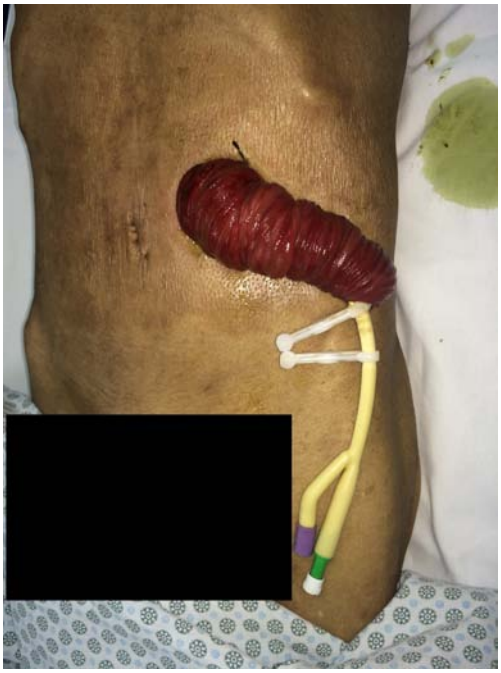

Fig.1: Fotografia evidenciando o prolapso da jejunostomia

Além do prolapso de jejunostomia, durante o ato cirúrgico foi evidenciado o balonete da Sonda de Foley hiperinsuflado, repleto de conteúdo alimentar, obstruindo a luz jejunal, bem como quatro perfurações da parede do jejuno no sítio do balonete impactado (Fig.2).

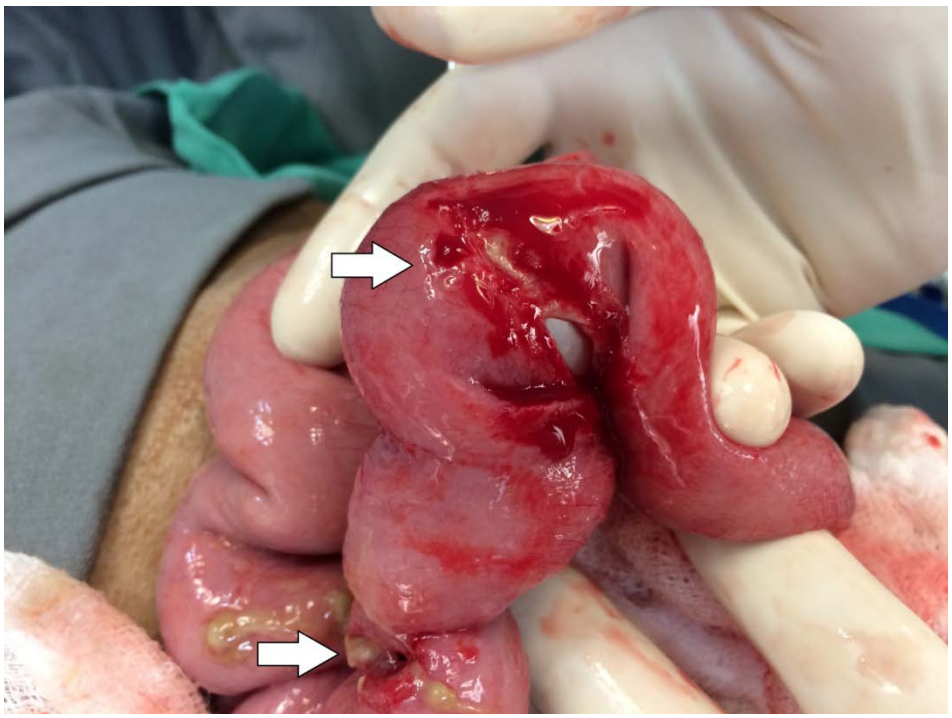

Fig. 2: Alça jejunal com múltiplas perfurações (setas brancas) identificadas no intra-operatório

A conduta intra-operatória incluiu a redução do prolapso jejunal, retirada da sonda de Foley após a perfuração do balonete e o esvaziamento do conteúdo alimentar, enterorrafia em dois planos nos sítios das perfurações e gastrostomia a Stamm-Senn (Fig.3).

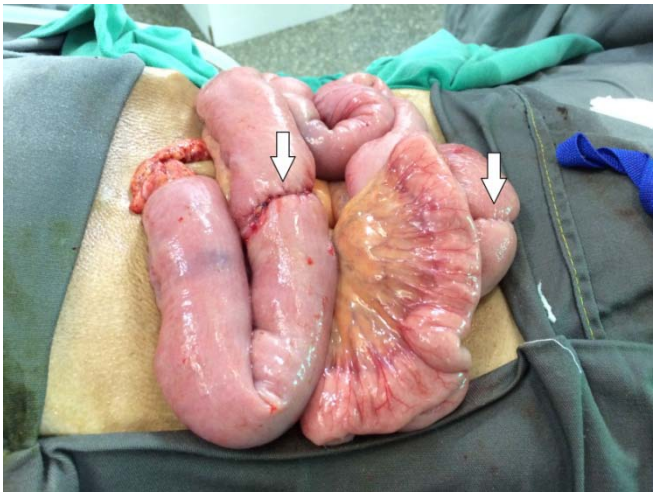

Fig. 3: Enterorrafia nos sítios das perfurações (setas brancas)

No pós-operatório o paciente teve dificuldade em aceitar a dieta enteral, cuja tentativa de introdução ocorreu no quarto dia de pós-operatório, sendo suspensa diversas vezes até o 12º dia de pós-operatório, a partir do qual o paciente obteve boa aceitação. Além disso, o paciente apresentou infecção de ferida cirúrgica, que foi inicialmente tratada com piperacilina/tazobactam de forma empírica e posteriormente com sulfametoxazol/trimetoprim após resultado de cultura, que evidenciou Staphylococcus aureus sensível a tal antibiótico, e por orientação da infectologista do serviço.

Durante a internação, o paciente apresentou piora da performance status, sendo avaliado pela equipe de oncologia e orientado suspender o tratamento oncológico e instituir cuidados paliativos com ênfase em medidas de conforto.

O paciente solicitou sua transferência para um hospital localizado na cidade em que residia, tendo sido transferido no 18º dia de pós-operatório, com boa aceitação de dieta, sem queixas e com resolução do quadro infeccioso.

III. Discussão

A jejunostomia, procedimento cirúrgico pelo qual uma sonda é inserida na luz do jejuno proximal, constitui uma das formas de ofertar dieta ao paciente por via enteral (Tapia et al., 1999). O Ministério da Saúde (2000) define nutrição enteral como todo e qualquer "alimento para fins especiais, com ingestão controlada de nutrientes, na forma isolada ou combinada, de composição definida ou estimada, especialmente formulada e elaborada para uso por sondas ou via oral, industrializado ou não, utilizada exclusiva ou parcialmente para substituir ou complementar a alimentação oral em pacientes desnutridos ou não, conforme suas necessidades nutricionais, em regime hospitalar, ambulatorial ou domiciliar, visando à síntese ou manutenção dos tecidos, órgãos ou sistemas."

A importância da alimentação enteral pós-operatória precoce em pacientes traumatizados e em pacientes criticamente enfermos tem se tornado evidente, levando a um interesse renovado em vias de acesso para suporte nutricional. (Han-Geurts et al., 2004). Muitas vias de acesso para o trato gastrointestinal para fins de alimentação enteral têm sido descritas, tais como o uso de sonda nasogástrica, sonda nasoentérica, gastrostomia, gastrojejunostomia e jejunostomia (DeLegge, 2018).

O primeiro relato da utilização de jejunostomia como via alimentar foi em 1858, por Bush, em pacientes com neoplasia maligna gástrica inoperável (Gerndt & Orringer, 1994). Desde então muitas técnicas têm sido empregadas, dentre as quais pode-se citar Stamm, Witzel longitudinal, Witzel transversal, gastrojejunostomia aberta, técnica por agulha-cateter, endoscópica-percutânea e por laparoscopia (Sriram, 1986; Tapia et al., 1999). A jejunostomia está indicada a pacientes que necessitam de alimentação por via enteral de forma definitiva ou temporária por período prolongado, nos quais a gastrostomia, procedimento cirúrgico que estabelece o acesso à luz do estômago através da parede abdominal, está contra-indicada. (Santos et al., 2011).

Tal como destacado por Medina-Franco et al. (2013), por se tratar de um procedimento cirúrgico, a realização de uma jejunostomia está sujeita a complicações, as quais, como já citado, podem ser classificadas em mecânicas, infecciosas, metabólicas e gastrointestinais. De acordo com dados da literatura, as complicações são mais frequentes na técnica em Y-de-

Roux (21%), menos comuns na técnica por agulha-cateter (1,5%), e de frequência intermediária nas demais técnicas (percutânea-endoscópica, Witzel e gastrojejunostomia aberta) (Tapia et al., 1999).

As complicações citadas com maior frequência incluem a retirada inadvertida da sonda, erosão cutânea devido ao extravasamento de conteúdo entérico, e sintomas gastrointestinais, tais como náusea, vômito, cólica abdominal, diarreia e constipação (Yagi et al., 1999).

Segundo O'Neill, Moore, Philips, e Martin II (2020), há relato de altas taxas de complicações em decorrência de disfunção da sonda de jejunostomia, as quais podem ser facilmente deslocadas e apresentar vedações imperfeitas nos orifícios de saída, levando a vazamentos, que podem ser incômodos para os pacientes e de difícil manejo pelos seus cuidadores. Tais autores estudaram pacientes submetidos a jejunostomia como adjuvância em ressecções esofagogástricas, hepáticas, pancretáticas e ablação pancreática, entre 2010 e 2018, no serviço de oncologia da Universidade de Lousiville, havendo complicação em 22% dos 542 pacientes. As complicações mais frequentes foram desalojamento do tubo (34%), obstrução do tubo (15,7%) e vazamentos ao redor dos tubos de jejunostomia (13,1%).

O prolapso e a perfuração intestinal são complicações raras e pouco descritas na literatura e não foram encontrados dados quanto à sua frequência, associação ao tipo de técnica realizada, ou à taxa de mortalidade (Rashid & Nazir, 2016; Tan & Sheen-Chen, 2001).

Uma das complicações encontradas no presente estudo foi também relatada por Rashid e Nazir (2016), que descreveram o caso de um prolapso da jejunostomia no 27º dia de pós-operatório, o qual também necessitou de laparotomia de urgência, em que foi realizado o fechamento da enterostomia e a confecção de uma nova jejunostomia, distalmente à anterior.

Stylianides, Date, Pursnani, e Ward (2008) e Vieiro-Medina, Rodríguez-Cuéllar, Ibarrra-Peláez, Gil-Díez, e Cruz-Vigo (2017) descreveram casos de perfuração intestinal em pacientes com jejunostomia, porém em nenhum dos casos foi constatada a hiperinsuflação do balonete como causa.

Na literatura compulsada até o momento não foi encontrado caso similar com prolapso e perfuração associados.

No tocante à hiperdistensão do balonete da sonda de Foley como causa de complicação em paciente portador de jejunostomia, conforme mencionado neste trabalho, alerta-se para o fato de que a hiperdistensão se deu pela infusão de alimentos na via incorreta, o que resultou em prolapso e perfuração intestinal. Na literatura foram descritos casos em que a infusão de soro ou de ar em excesso no balonete da sonda de Foley levou à obstrução intestinal (Chester & Tumbull, 1998; Merrick & Howard, 1990).

IV. Conclusão

De acordo com Merrick e Howard (1990), o uso de sondas de jejunostomia após grandes cirurgias é muito útil no apoio à nutrição e na ajuda em convalescença para muitos pacientes. Vários tipos de cateteres e métodos de implante podem ser utilizados, tais como as sondas do tipo Foley, que são frequentemente utilizados para jejunostomia. No entanto, como já descrito, diversas complicações podem ser decorrentes de seu uso inadequado.

Em um estudo retrospectivo realizado por Myers et al. (1995), foram analisados dados da implantação de 2022 cateter de jejunostomia pela técnica agulha-cateter em 1938 pacientes durante 16 anos. Os dados foram comparados com os descritos em 11 séries publicadas que envolveram 50 ou mais pacientes e relataram complicações. A título de estudo, os autores consideraram apenas complicações com implicações cirúrgicas, para cada qual delinearam uma estratégia preventiva. A complicação mais comum em ambas as séres foi o desalojamento do cateter, a qual esteve relacionada às transferências de pacientes da cama para a cadeira, ao transporte para realização de exames e às mudanças de decúbito durante o banho e a realização de curativos. Foi constatado também que a oclusão dos cateteres foi mais comumente associada à administração inadequada de medicamentos (medicamentos triturados, xaropes espressos, formulas entéricas de alta viscosidade) ou à má manutenção do cateter. A falta de cuidados com a pele no sítio da jejunostomia foi a única causa extrínseca identificável dos abscessos subcutâneos. Os autores concluíram que as complicações foram raras e, na maioria dos casos, evitáveis com posicionamento, uso e monitoramento adequados.

No caso relatado neste estudo o paciente apresentou graves complicações decorrentes do uso inadequado da sonda Foley, o que requereu tratamento cirúrgico e que poderia ter sido evitado. Portanto, é de suma importância que os familiares e cuidadores envolvidos no suporte de pacientes em uso de jejunostomia recebam informações precisas e adequadas quanto à manipulação da sonda por parte dos profissionais de saúde assistentes.

A mortalidade após a realização da jejunostomia é rara se o paciente é adequadamente preparado, se a técnica operatória é bem executada e sem contaminação. Além disso, a continuidade da qualidade do cuidado com a sonda deve ser mantida, seja ele feito por profissionais da saúde ou em casa por familiars e cuidadores. A morbidez está relacionada principalmente com a incontinência da estomia, infecção da parede e troca de sondas. Na

incontinência, o refluxo da secreção gástrica em torno da sonda é fator de contaminação e infecção peritoneal e parietal, além de lesões cutâneas (Santos et al., 2011).

Os estudos indicam estatísticas favoráveis quando a manipulação de sondas em jejunostomias para dietas enterais é feita por profissionais especializados ou sob sua orientação, sobretudo enfermeiros. Como líder da equipe de enfermagem, o enfermeiro tem um papel fundamental no direcionamento da assistência a ser prestada a esses pacientes, a qual deve sempre ser pautada nas melhores evidências disponíveis sobre o tema. (Reppetto & Souza, 2011).

Este trabalho tem como objetivo demonstrar, por meio do relato de caso descrito, a relevância dos cuidados referentes à manipulação das sondas de jejunostomia, já que a demonstração dos resultados e informações obtidos com o caso podem esclarecer aspectos potencialmente problemáticos quanto ao manejo da sonda, evitando assim que novos casos semelhantes ao descrito ocorram.

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Management of Acute Appendicitis in Covid Pandemic- A Prospective Study of 25 Cases

By Dr. Abhishek Mahadik, Dr. Meena Kumar, Dr. Nida Khan, Dr. Manish Kumar & Dr. Meenal Mapari

Abstract- Acute Appendicitis is a surgical emergency. Patients present with pain in right lower abdomen, with other symptoms like nausea/vomiting, fever, diarrhoea, urinary symptoms. Diagnosis is based on a multimodality approach that includes, clinical, radiological and pathological findings. Alvarado Score helps determine the severity of infection, confirm diagnosis and guide further management. Management is either conservative with antibiotics or surgical depending on severity. However approach to surgical management has changed with the ongoing Covid-19 pandemic. It has necessitated categorisation of surgical procedures into essential and non essential to limit risk to both patient and surgical team and also for prioritization of resources to the rising, continued spread of Covid-19. We present a prospective study of 25 cases of appendicitis presenting during the Covid Pandemic between 15th March and 30th May to our hospital, with an intent to try conservative management for all patients except in the presentations with complications like perforation, abscess or the presence of fecolith or poor response to conservative management. Patients not amenable to conservative management were treated by Open appendicectomy.

Keywords: *acute appendicitis, Covid-19, alvarado score, appendicectomy.*

GJMR-I Classification: *NLMC Code: QW 168.5.C8*

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Dr. Abhishek Mahadik [α], Dr. Meena Kumar [σ], Dr. Nida Khan [ρ], Dr. Manish Kumar [ω] & Dr. Meenal Mapari [¥]

Abstract- Acute Appendicitis is a surgical emergency. Patients present with pain in right lower abdomen, with other symptoms like nausea/vomiting, fever, diarrhoea, urinary symptoms. Diagnosis is based on a multimodality approach that includes, clinical, radiological and pathological findings. Alvarado Score helps determine the severity of infection, confirm diagnosis and guide further management. Management is either conservative with antibiotics or surgical depending on severity. However approach to surgical management has changed with the ongoing Covid-19 pandemic. It has necessitated categorisation of surgical procedures into essential and non essential to limit risk to both patient and surgical team and also for prioritization of resources to the rising, continued spread of Covid-19. We present a prospective study of 25 cases of appendicitis presenting during the Covid Pandemic between 15th March and 30th May to our hospital, with an intent to try conservative management for all patients except in the presentations with complications like perforation, abscess or the presence of fecolith or poor response to conservative management. Patients not amenable to conservative management were treated by Open appendicectomy.

Keywords: acute appendicitis, Covid-19, alvarado score, appendicectomy.

Abbrevations: CT (Computed Tomography), PPE (Personal Protective Equipment), ULPA (Ultra Low Particulate Air Filteration)

I. Introduction

Acute appendicitis is a surgical emergency. It is the most common cause of acute abdomen in North America, with approximately 1/3rd presenting with perforation at presentation. Incidence is 84/100000 population.[1] CT is gold standard for imaging in acute appendicitis, however associated with increased radiation exposure. Alvarado Score is used to predict the severity of appendicitis, and uses clinical symptoms, signs and laboratory markers and negates the need for radiation exposure.[2] Management of appendicitis is either conservative or surgical. Conservative management can be tried for non complicated appendicitis, whereas presence of complications like perforation, fecolith, abscess dictate surgical management.[3,4] However, the Covid-19 pandemic changes routine surgical management. Operating theatres are high risk areas for transmission, additional strain on the team and resources due to increasing prevalence of Covid-19, risk to operating team has called for a change in protocols to determine essential vs non essential procedures. Proper education of surgical staff regarding use of PPE and decreased exposure of healthcare staff is the key to minimising risk of infection in the team.[5] Uncomplicated appendicitis can be managed with antibiotics and monitored for improvement in symptoms, signs and hemogram for leucocytosis. Complicated cases that cannot be otherwise conserved can be operated taking all the necessary precautions such as pre operative COVID-19 testing, including Personal Protective Equipment (PPE) for operating team, limiting the members of operating team, proper operating room ventilation and air purification, dedicated Covid-19 positive and Covid-19 suspect wards, clear path for transport with limited traffic are the need of the hour. Laproscopic surgeries carry higher risk over open surgeries due to the risk of aerosol transmission.[6].

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II. Material and Method

A Prospective study was done on all patients presenting to Dr. D.Y Patil Hospital, Navi Mumbai, India with clinical features of acute appendicitis during covid pandemic, from 15th March to 30th May.

Inclusion Criteria

1. Patients presenting with clinical features of acute appendicitis, diagnosed clinically and confirmed on ultrasonograpy and evident as leucocytosis on hemogram were included in the study.
2. Patients willing to participate in the study.
3. Patients who followed up for 7 days after discharge.

Exclusion Criteria

1. Patients not willing to participate in the study.
2. Patients who did not follow up after discharge.

All patients presenting with right iliac fossa during the above stated period were evaluated. Following parameters were noted for all patients and compared.

Patients above 15 years of age were included in the study. Thorough history taking and examination was done for the patients. Presenting symptoms of pain in abdomen, nausea/vomiting, fever, loss of appetite, loose stools, urinary frequency were evaluated. History of recent travel, contact with covid positive or covid exposed patients was asked for. Any significant co

morbidities and past surgical histories were noted. *Covid swab was sent for all patients on admission.* Complete physical examination was done for the patients. Pulse rate, Blood Pressure examination, Per abdominal examination was done to look for tenderness and its site, presence of any guarding or rigidity. Chest Xray was done for all the patients to rule out features of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), including atypical or organising pneumonia, often with a bilateral, peripheral, and basal predominant distribution. A hemogram was done for all patients. Ultrasound examination was done for all patients, including diameter of appendix, periappendiceal fat stranding or collection with other features such as presence of appendiculoliths, gas within the lumen of appendix, loculated collection and appendicular phlegmon were noted. Based on ultrasound findings, patients were classified into Group A and B, Group A had cases of uncomplicated appendicitis that were conserved, whereas Group B had cases of Complicated appendicitis including, appendiculolith, appendicular perforation, appendicular abscess. Patients of group A who did not respond to conservative management within 24-48 hours were operated and included in group B.

Conservative management included, keeping the patient nil per oral for 48 hours with intravenous antibiotics for 3-5 days, shifted to oral antibiotics after that.

These patients were regularly examined for worsening of clinical signs including change in abdominal examination findings, with repeat leucocyte count being done at 48 hours. One patient in Group A did not improve after 48 hours and was taken up for surgery.

Patients operated were treated will all precautions and use of PPE and open appendectomy was done. *Laproscopic appendectomy was not done due to increased risk of aerosol exposure to operating team.* Patients were given intravenous antibiotics for 3 days in view of complicated appendicitis, then shifted to orals. Patients were kept nil per oral for two days after surgery, then shifted to orals. Suture removal was done on POD 10.

All patients were tested for Covid-19, and turned out to be negative.

All patients were followed up for 7 days after discharge, with plan to follow up if symptomatic in the future.

Patients with appendicular lump were asked to follow up after 4 weeks, and before that if symptomatic.

III. Result and Discussion

Out of 25 patients, 15 were males and 10 were females.

Age distribution was as follows,

Age distribution (in years)	Number of patients (n=24)
15-25	16 (64%)
26-35	6 (24%)
36-45	3 (12%)
46-55	0
>55	0

Comorbidities- One patient was diabetic and hypothyroid and others had no comorbidities.

Duration of pain in right iliac fossa was compared,

Duration of symptoms (in hours)	Number of patients (n=24)
<24h	2 (8%)
24-48h	10 (40%)
48-72h	6 (24%)
>72h	3 (12%)

Presenting symptoms were compared, including, Pain in right iliac fossa, nausea/vomiting, anorexia, fever, diarrhoea, urinary complaints.

Presenting complaint	Number of patients (n=24)
Pain in right iliac fossa	25
Nausea/ Vomiting	10
Fever	1
Diarrhoea	0
Urinary Complaints	0

Alvarado Score for the patients in both group A and B group were compared.

GROUP A (Conservative Management)- 19 patients

Alvarado Score	Number of Patients (n=19)
1-4	0
5-6	2 (11%)
7-10	17 (89%)

GROUP B (Operative Management)- 6 patients

Alvarado Score	Number of Patients (n=6)
1-4	0
5-6	2 (33.33%)
7-10	4 (66.66%)

Leucocyte count of the patients were compared, 14 patients had leucocytosis (>11,000/L), wheras 11 patients had leucocytes within the normal range.

USG diameter of appendix

Appendix diameter	Number of Patients (n=25)
</= 6mm	3 (12%)
>6mm	18 (72%)

USG evidence of appendicular abscess/ fecolith/ perforation/ appendicular mass

USG Findings	Number of patients
Appendicular abscess/ perforation	2 (8%)
Fecolith	0
Appendicular mass	2 (8%)

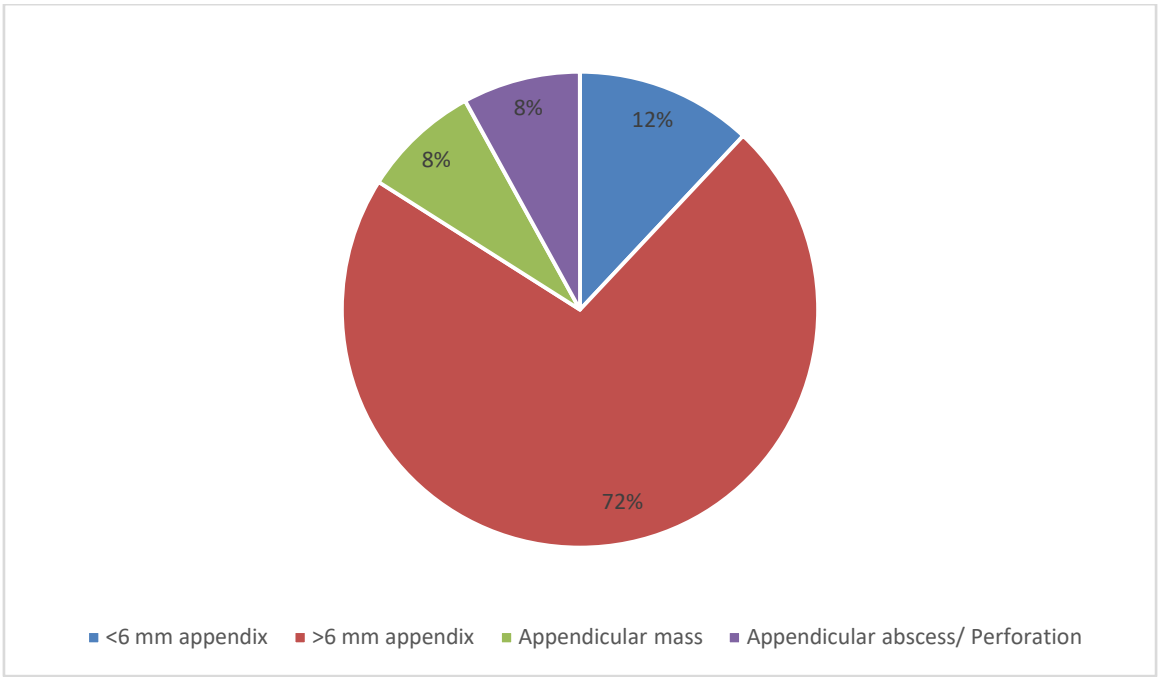

Figure 1: USG FINDINGS

Number of patients operated verus conserved

Treatment	Number of Patients (n=24)
Conservative	19 (76%)
Operative	6 (24%)

Out of the six operated patients, indications for surgery were as follows

Patient (Serial number)	Indication
1	Guarding on presentation, elevated leucocyte count
2	Tender RIF, Elevated leucocyte count, Appendicular perforation on USG
3	Tender RIF, Elevated Leucocyte count Appendicular perforation on USG
4	Worsening of symptoms, abdominal examination findings and leucocytosis
5	Guarding on presentation, elevated leucocyte count
6	Worsening of symptoms, abdominal examination findings and leucocytosis

Antibiotics given: Antibiotics were given depending on clinical severity and leucocytosis. Metronidazole was given to all patients for anerobic coverage. Cefoperazone with sulbactam was given to 14 patients, whereas ceftriazone was given to seven patients and piperacillin tazobactam was given to four patients.

Duration of hospital stay in group A vs B

Group	Mean Duration of Hospital Stay
Group A (Conserved)	4.47 days
Group B (Operated)	6.8 days

It was observed that 64% of patients were in the age group of 15-25 years. All 25 patients presented with pain in right iliac fossa, while 10 % had accompanying nausea/ vomiting. 40% patients had a 24-48h history of pain in abdomen, 24% patients had a 48-72h history, 12 % had a history of >72h and 8% had <24h history of pain in abdomen. In Group A, 89% patients had an Alvarado Score of 7-10, 11% had a score of 5-6 and were conserved. Group B that underwent surgical management had an Alvarado score of 7-10 in 66.66% patients and a score of 5-6 in 33.33% patients. Out of 25 patients, 6 patients who underwent operative management had adverse clinical signs on presentation, with leucocytosis or worsening after admission or appendicular perforation as presentation.

The first historical description of appendix and its inflammation dates back to the 16th century. The first appendectomy was described by Amyand in 1736, when he discovered inflamed appendix in a patient of hernia with enterocutaneous fistula.[7] Appendix is a blind muscular tube, with mucosa, submucosa, muscular and serosal layers. It is short and broad at birth, then becomes tubular by 2 years of age. Appendix comes to lie in retrocaecal position as the caecum grows and appendix rotates. Failure of this rotation results in pelvic, subcaecal and paracaecal positions. The base of the appendix, however remains constant, at the confluence of the three tenia, and can help find the appendix intraoperatively by tracing anterior tenia.[8] Appendicitis is inflammation of appendix. Etiology of appendicitis includes decreased dietary fibre, increased consumption of refined carbohydrates and often luminal obstruction by fecolith or stricture. Pathology of appendicitis involves obstruction of lumen, lymphoid hyperplasia, increased intraluminal pressure, oedema and mucosal ulceration, venous obstruction and ischemia of appendix wall leading to gangrene and perforation. Infection may get contained by antibiotics or greater omentum and loops of small bowel become adherent to inflamed appendix and form a phlegmonous mass or paracaecal abscess. Risk factors for appendicular include diabetes mellitus, immunosuppression, extremes of age, fecolith, pelvic surgery, previous abdominal surgery. Diagnosis is based on clinical and radiological findings, with leucocytosis on hemogram. Alvarado score is commonly used to confirm the diagnosis and predict the severity of appendicitis.[9]

Feature	Score
Migration of Pain	1
Anorexia	1
Nausea	1
Tenderness in Right Lower Quadrant	2
Rebound pain	1
Elevated Temperature	1
Leucocytosis	2
Shift to left	1
TOTAL	10

A Score of 1-4, patient can be discharged, 5-6, observation/ admission is advised, whereas for 7-10, treatment is surgical. Surgery can be open appendectomy or laproscopic appendectomy. Conservative management can be tried for uncomplicated cases. However presence of

complication such as fecolith, appendicular abscess, appendicular perforation require surgical management. A third generation cephalosporin and imidazole derivative have been successfully used for conservative management of uncomplicated appendicitis.[10]. Presentation as appendix mass is conserved with antibiotics.[11]

Covid-19 is caused by SARS-COv-2, known commonly as coronavirus. It is responsible for an outbreak beginning in Wuhan in December 2019, then spreading to majority of the world. It causes asymptomatic infection to mild pneumonia like illness, spreading by person to person contact via droplets. Fulminant infection may develop leading to severe pneumonia, renal failure and even death. The existence of this pandemic makes surgical management a challenge as it risks exposing the surgical team to known, suspected or asymptomatic Covid-19 cases. Surgical management has to be limited to cases, that cannot be otherwise conserved or postponed, to limit unnecessary exposure of both the surgical team and the patient to Coronavirus. It also allows diversion of members of the team towards management of Covid-19 pandemic associated increased admissions.[12]. Laproscopic surgery involves creation of pneumoperitoneum which increases risk of aerosol exposure to the operating team. Electrical equipment and harmonic scalpels used in laproscopic surgery generate surgical smoke that cannot effectively deactive cellular component of the virus. Level 3 protection is mandatory for the operating team. Closed smoke evacuation/ filteration systems with ULPA (Ultra Low Particulate Air Filteration) capacity should be used during MIS, minimal use of energy sources, separate cleaning of surgical equipment need to be exercised.[13]

All patients to be considered as COVID-19 positive unless proven otherwise, and operated with proper precautions that need to be exercised for positive patients. Patients have to be explained the risk of aquiring covid-19 during procedure and hospitalisation.

IV. Conclusion

Acute appendicitis, with prevalent Covid-19 and its associated morbidity to the patient undergoing surgical procedures and risk to the operating team can be managed conservatively, even with a higher Alvarado Score on presentation, unless complicated with fecolith, appendicular perforation or abscess or failure to resolve after conservative management. Conservative management decreases the burden on the already overwhelmed hospital resources, medical team due to Covid-19 and limits unnecessary exposure for both patient and the operating team.

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Single-Breath Counting: An Alternative to Evaluate the Evolution of Pulmonary Function in the Postoperative Period of Cardiac Surgery

By Jéssica Amorim Magalhães, Reydiane Rodrigues Santana, Carmira Fernandes Jerônimo, Angélica Pereira da Cruz, Renata Lemos Lins, Emília Chagas Costa, Cláudio Gonçalves de Albuquerque, Marco Aurélio de Valois Correia Júnior & Flávio Maciel Dias de Andrade

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Abstract- *Purpose:* To evaluate the evolution of lung function through Slow Vital Capacity (SVC) and Single-breath Counting (SBC) in the cardiac surgery's period postoperative, evaluating a possible correlation between the technics.

Methods: Longitudinal research, 18 to 80 years old patients. SVC and SBC were randomly evaluated. The SVC was measured using the ventilometer. To evaluate the SBC, the patients was instructed to breathe deepest possible and then breathe out while counting in ascending order trying to arrive in the larger number possible in a unique exhale. Was realized three repetitions. The SVC and the SBC were evaluated daily until discharge from the hospital.

Results: Twenty-four patients completed the protocol. The evaluations were done during at least six days. There was a progressive increase in SVC (Day one: 1,0± 0,2L vs day six: 1,3 ± 0,3L; p <0,05) and SBC Day one: 11,7 ± 7 vs day six: 24 ± 7;, p <0,05). Beyond positive correlation from moderate to strong between both techniques from second to fifth day, in relative ideal weight form, and from second to sixth day in absolutely form of the SVC.

Keywords: *vital capacity. phonation. surgery cardiac.*

GJMR-I Classification: *NLMC Code: WG 420*

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Abstract- Purpose: To evaluate the evolution of lung function through Slow Vital Capacity (SVC) and Single-breath Counting (SBC) in the cardiac surgery's period postoperative, evaluating a possible correlation between the technics.

Methods: Longitudinal research, 18 to 80 years old patients. SVC and SBC were randomly evaluated. The SVC was measured using the ventilometer. To evaluate the SBC, the patients was instructed to breathe deepest possible and then breathe out while counting in ascending order trying to arrive in the larger number possible in a unique exhale. Was realized three repetitions. The SVC and the SBC were evaluated daily until discharge from the hospital.

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Conclusions: There was a progressive improvement from SVC and SBC until the postoperative sixth day, having positive correlation between the techniques. The SBC can be a simple strategy to evaluated the lung function.

Keywords: vital capacity. phonation. surgery cardiac.

Condensed Abstract- To evaluate the evolution of lung function through Single-breath Counting (SBC) in the twenty-four patients cardiac surgery's period postoperative. There was a progressive increase in Slow Vital Capacity and SBC. The SBC can be a simple strategy to evaluated the lung function.

I. Introduction

The cardiac surgery (CS) is an invasive and high risks process that finds the valvulopathies correction, arterial aorta diseases, congenital heart disease and revascularization of the myocardium. The incidence of these surgeries has increased in developing countries, and although it has evolved enough, the procedure also is related to many risk factors for postoperative complications [1]. Among these risks, is the decrease in ventilatory function, which may predispose to the occurrence of complications, such as hypoventilation, with consequent hypoxemia [2,3].

In cardiac surgery, the lung function evaluation is fundamental, because helps in differential diagnostic of the disease, moreover being a prognostic marker of the surgical procedure, since postoperative pulmonary complications are important causes of morbidity and mortality in this population [4]. Among the existing methods for this evaluate, the Slow Vital Capacity (SVC) is one of the most important procedures. It is defined by the maximum amount of air exhaled by lungs from the full breath in. However, for this measurement it is necessary to use equipment like ventilometer and/or espirometers that cannot always are available in the practice's clinical, beyond being expensive and need qualified professionals to realize the evaluation.

As the phonation is directly related- to respiratory system, some authors have proposed other technique that use the speech to evaluate the SVC [5-7], owing to would need just the voice to evaluate, besides being a simple technique, without cost and that would be realized at any ambient. The Single-breath Counting (NCT) is conceited like the maximum numeral the person can count during a full breathe out after a deep breath in. This technique already done described in hospitalized patients [8,9], however there is a lack in evaluate in different populations, especially in surgery cardiac's patients.

Because it is an objective measure, SBC can serve as a parameter for prognosis and evaluation of the evolution of pulmonary function after a CS, especially in locations that don't have equipments like the espirometers and/or ventilometers. Beyond that, can be a useful tool in discharge from hospital, where the patient can be guided to looking for a specialized service in the moment to identify the SVC and SBC

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evolution in cardiac surgery's period postoperative and to evaluate a possible association between both.

II. Methods

It is about a longitudinal research, that the choice among the techniques (SVC and NCT) was realized in a random way (aleatory numbers' technique). This research was realized in a surgical recovery unit from a heart surgery's reference hospital, between the years 2015 and 2016. The project was agreed for the Research ethics committee involving human beings from the University of Pernambuco (Comitê de ética em pesquisa envolvendo seres humanos da Universidade de Pernambuco – CAAE. Protocol Number 20222613.5.0000.5207).

The criteria of inclusion was volunteers in the immediate postoperative period of cardiac surgery, conscious, oriented, extubated more than 24 hours ago end between 18 to 80 years old. We excluded individuals with consciousness' level altered (Glasgow coma scale≤ 13), hemodynamically instables, with pulmonary comorbidities' history, that show cardiovascular and/or lung complication's postoperative, like such as high throughput measured through thoracic drains, dyspnea (respiratory frequency – RF > 30 ipm), Signs of hypoxemia (peripheral oxygen saturation – SpO_2 <90%, partial arterial oxygen pressure – PaO_2 <80 mmHg), bronchospasm and the individuals unable to assimilate the techniques, or perform them as a result of pain. The evaluations should be suspended if the individuals show consciousness' level altered (Glasgow coma scale ≤ 13), get worsening clinical which prevents the evaluate, difficulty to execute the techniques or any discomforts in the course of the conduct, including change of mean arterial pressure – MAP > 20mmHg, SpO_2 < 90% and variation ± 20 bpm in heart rate, any day of hospitalization.

First, was collected variables about age, sex, height, weight, time and kind of surgery, Extracorporeal Circulation, time of anoxia, time of extubating, use of vasoactive's drugs, type and number of thoracic drains. The SVC and SBC was daily evaluated, always at morning, during all period of hospital internment. The patient was oriented to sit comfortable on the hospital bed to evaluate. An interval of 10 minutes was respected between the two evaluation modalities [5]

The SBC was chosen for phonation maximum time evaluation. The patient was asked to perform a maximum inspiration, and next begins the full breathe out, then starts the numerical count in crescent order, starting by number one until the biggest number possible arrived, in which the tone and the intensity of the voice show naturalness [9]. Three measurements were taken, respecting a time interval of one minute between the maneuvers, taking as reference the highest value obtained.

The SVC was evaluated using the Wright Mark 8 Ventilometer (nSpire Health Ltd – England), connected to the individual by a buccal and a nasal clip so that there was no air leakage [10]. The volunteers were stimulated to realize a full breathe in, followed by a complete expiration until to obtain the residual volume [10]. Three measurements were also realized, respecting a time interval of one minute between the maneuver, taking as reference the biggest value obtained. The SVC was adjusted for predicted body weight (relative form), calculated from height using the standard formulas: predicted body weight (males) = 50 + 0.91 (cm of height – 152.4); or predicted body weight (females) = 45.5 + 0.91 (cm of height – 152.4).

a) Statistical analysis and sample calculation

The sample calculation was made starting by the Gpower 3.0.10 software, considering a $\alpha = 0,05$, a power of 95% ($\beta = 0,05$), and a correlation coefficient identified in a previous study of 0.75 [8]. Based in these data, came to a minimum sample of 11 individuals. Considering that in the year of the study, 197 surgical procedures were performed and considering possible losses, we chose to more than triple the sample, reaching a total of 35 patients. These patients were selected from the natural admission in the first months of collection.

The data were processed and analyzed using the GraphPad Instat program (GraphPad Inc., San Diego, USA, Release 3.06, 2003). Initially, they were submitted to normality criteria (Shapiro-Wilk test). Mean and standard deviation (SD) were used to present continuous variables, while categorical data were presented using absolute and relative frequencies. The relationship between the variables was established through the linear correlation of Pearson and Spearman. The comparisons between the medians were performed using the Friedman test and the Dunn post-test. Bilateral 'p' values were calculated, and the significance level adopted was 5%.

III. Results

Initially 35 patients was included on the research in which 11 were discontinued (one because presents asthma, six had clinical worse or consciousness' level altered during the hospital internment and four had difficulty performing the technique correctly.) The 24 remaining patients (70,8% from masculine sex) were accompanied until hospital discharge.

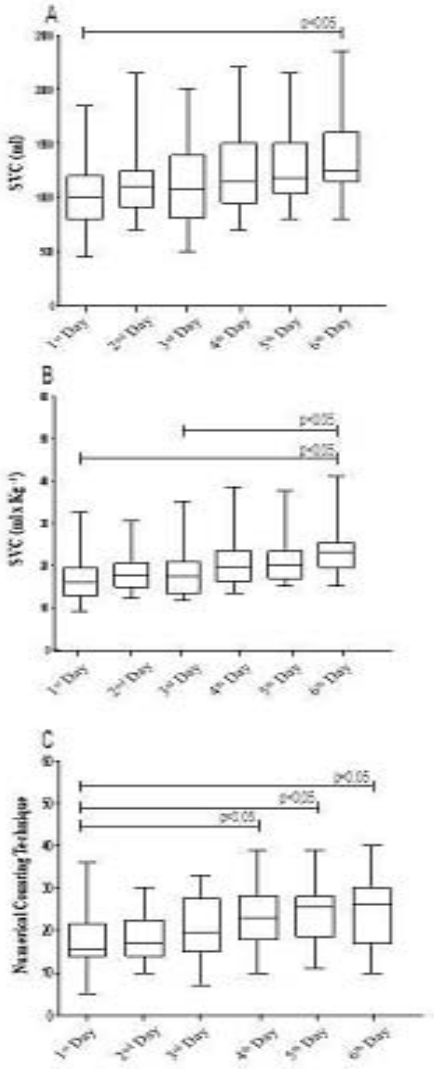
On the Table 1 is exposing the general description of the sample. The most of sample was constituted by surgery of myocardium's revascularization (20%), following by valve change (12,5%). The patients had an average surgery time of 201 minutes, with an average time to extubation of 1.212 minutes.

Table 1: General characterization of the sample

Variáveis	n = 24
Age (years)	59 ± 9.0
Ideal Weight (Kg)	61.2 ± 7.6
Height (cm)	166 ± 7.0
Surgery Time (min)	201 ± 57
Time to Extubation (min)	1212 ± 2193
Extracorporeal circulation time (min)	80 ± 29
Time of anoxia (min)	44 ± 18
Extracorporeal Circulation	20 (83.3%)
Sex	
Female	07 (29.1%)
Masculine	17 (70.8%)
Type of Surgery	
Valve Change	03 (12.5%)
Revascularization of the myocardium	20 (83.3%)
Two procediments	01 (04.1%)

Values were expressed as mean ± standard deviation and absolute numbers (%)

Figure 1 shows the behavior of SVC $_{(ml)}$, SVC $_{(ml/Kg)}$ and NTC during the first six days after extubation. The two techniques were able to identify difference on the sixth day when compared to the first day evaluated. The SVC $_{(ml/Kg)}$ also shows a difference between the third day (figure 1B) and the SBC between the fourth and fifth day (figure 1C).



Kruskal-Wallis Test and Dunn's post-test.

Figure 1: Evolution of the evaluation of the Slow Vital Capacity (SVC) observed in an absolute (1A) and relative (1B) and in the Single-breath Counting (NCT) (1C) in the first six postoperative days.

The correlations between SBC and SVC relative and absolute are shown in table 2. A positive correlation can be verified between the second and fifth day techniques, in absolute form, and from the second to the sixth day in relative (ideal weight) form.

Table 2: Correlations between Slow Vital Capacity (SVC) and Single-breath Counting (NCT) evaluated evaluated from the first postoperative day to the sixth postoperative day

Days	SVC ml	NCT	r	p	SVC ml/Kg	NCT	r	p
1 (n=24)	1.019 ± 279,8	17.2 ± 7.2	0,40	0,05**	16,6 ± 4,8	17,2 ± 7,2	0,37	0,07**
2 (n=24)	1.129 ± 322,7	18.3 ± 5.4	0,44	0,03**	18,3 ± 4,6	18,3 ± 5,4	0,58	< 0,001**
3 (n=24)	1.125 ± 356,7	20.3 ± 7.0	0,76	< 0,001*	18,2 ± 5,1	20,3 ± 7,0	0,73	< 0,001**
4 (n=23)	1.250 ± 391,4	23.1 ± 7.2	0,62	< 0,001*	20,4 ± 5,8	23,1 ± 7,2	0,48	0,02**
5 (n=22)	1.273 ± 332,2	24.0 ± 6.9	0,56	< 0,001**	20,9 ± 4,9	24,0 ± 6,9	0,48	0,02**
6 (n=19)	1.384 ± 359,1	24.2 ± 7.2	0,35	0,13*	23,1 ± 5,5	24,2 ± 7,2	0,47	0,04**

** Correlação de Pearson ** Correlação de Spearman*

IV. Discussion

In this study, the Single-breath Counting, as well as the SVC, was able to identify an objective improvement in pulmonary function on the sixth day when compared to the first postoperative day of patients undergoing cardiac surgery. This suggests that the proposed technique, as well as established methods, is able to follow the evolution of pulmonary function, perceiving its alterations and showing a positive correlation with SVC on most days evaluated.

It is described in the literature that pulmonary function is compromised up to the fifth postoperative day of CS [11,12]. According to the authors [11,12] this injury mainly occurs due to surgical incision, anesthesia, pain and impaired pulmonary mechanics. Larsen et al. [13] evaluated the third and sixth day after the surgical procedure and visualized that in the sixth there was improvement of vital capacity. According to Borges-Santos et al. [14], the restitution of Forced Vital Capacity (FVC) values to those found in the preoperative period occurs only between the 15th and the 30th day in elective thoracotomy patients. As in the studies described previously [11-13], the present research was able to find improvement in vital capacity from the sixth day.

Like the SVC, the SBC was also able to identify this difference from the sixth day. This finding is important because it opens the possibility of using another simpler and cheaper technique and does not need specific equipment to evaluate the pulmonary function of patients in the postoperative period of cardiac surgery, especially when there is no availability of more consecrated methods such as spirometry. This result is valid under study in the population proposed in the study, patients in the postoperative period of CS, in which it is already expected that lung volumes and capacities are decreased. In addition to being an audience, the evaluation of pulmonary function is extremely important [15], since the monitoring of these measures allows early identification of possible ventilatory dysfunctions, avoiding greater complications and reducing morbidity and mortality rates [14,16,17].

This improvement in the postoperative pulmonary function identified in the two techniques suggests a direct relationship between them. Other authors have reported a positive correlation between SBC and SVC in healthy individuals [5] and hospitalized [8,9], indicating that this technique can be used in varied populations, obtaining good results. However, studies evaluating SBC versus SVC with cardiac surgery patients were not found. In our study, a moderate to strong positive correlation was found [18] between SBC and SVC from the second to the fifth day (in relative form) and from the second to the sixth day (in absolute form).

Palmeira et al. [8] also found a positive correlation between SVC and SBC in hospitalized patients when evaluated in an absolute (r = 0.75) and relative (r = 0.76). Cardoso et al. [9] showed that the correlation occurred for both sexes (r = 0.856), and for males (r = 0.870) and females (r = 0.818) individually. However, unlike the present study, which evaluated patients undergoing cardiac surgery, excluding those with a history of prior pulmonary comorbidities, in these studies [8,9], the disease presented by the patients was not used as a criterion in the evaluation, thus, a diversified sample.

Despite presenting an attractive alternative to methods already established in the literature [5,8,9], the use of this technique should be used with caution by health professionals and further studies should be performed in this population to assess whether the behavior of this technique is capable to detect differences in lung function as well as spirometry. A possible limitation of this study may have been the great loss of patients due to the daily follow-up, since some patients altered the level of consciousness or even presented clinical worsening and had to be excluded. In addition, the severity of the clinical picture after the

surgery and lack of understanding of the technique were factors that prevented the recruitment to the research.

Anyway, this research makes an important contribution to the monitoring of pulmonary function in patients undergoing cardiac surgery in places that do not have specific devices for evaluation, and opens a range of options in scientific research. It presents, therefore, a technique that is proving viable to follow the behavior of the pulmonary function of these patients, aspect of great importance for the prognosis and evolution of these individuals, and without the need of any additional device or resource. In addition, it can be performed in any environment and by the patient himself, who can follow his evolution and still identify a possible functional limitation, being previously advised to look for a specialized service, if this happens, to prove the change and to looking for treatment.

V. Conclusion

In this research was possible to identify a difference between the first and the sixth day in both SBC and SVC. In addition, there was a moderate to strong positive correlation between the two techniques from the second to the fifth day, in absolute form, and from the second to the sixth day in the relative form.

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A Randomized Study of Comparison of Intravenous Dexmedetomidine and Intravenous Esmolol to Attenuate the Cardiovascular Responses to Laryngoscopy and Endotracheal Intubation

By Ninad Deepak Chodankar & Bhagyashree Shivde

Abstract- Design: Prospective, Randomized, controlled study.

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Method: Study was done on 60 adults, ASA grade I or II normotensive patients, undergoing elective surgery under general anaesthesia and willing to participate. These patients were be randomly allocated in to either group E (Esmolol) or D (Dexmedetomidine). Group 'D', patients were given intravenous Dexmedetomidine infusion 1 mcg/kg over 10 minutes, 3 minutes before start of laryngoscopy. Group 'E', patients were given intravenous Esmolol 1.5 mg/kg 2 minutes before start of laryngoscopy. All patients were premedicated, induced and intubated using Thiopentone and Succinyl Choline as per the protocol.

Keywords: laryngoscopy, intubation, Esmolol, hemodynamic, reponse, dexmedetomidine.

GJMR-I Classification: NLMC Code: WV 505

Strictly as per the compliance and regulations of:

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Analysis: For quantitative data, Unpaired Student's t-test was used. For comparison of categorical variables chi-square test was used. P-values of < 0.05 will be considered significant.

Results: Immediately after intubation, Heart rate was similar in Group D and Group E, thereafter HR remained higher in Group E as compared to Group D, and difference was statistically significant.

SBP, DBP and MAP recorded was higher in Group Eas compared to Group D, and difference was statistically significant

Conclusion: We conclude that intravenous Dexmedetomidine 1ug/kg is better drug to attenuate hemodynamic response to laryngoscopy and intubation as compared to intravenous Esmolol 1.5mg/kg.

Keywords: laryngoscopy, intubation, Esmolol, hemodynamic, reponse, dexmedetomidine.

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I. Introduction

Laryngoscopy and endotracheal intubation is accompanied with significant increases in heart rate and arterial blood pressure (1), and can lead to adverse outcome. These cardiovascular responses are transient occurring at around 30 seconds after intubation and can last upto 10 minutes (2). The sympathetic stimulation is also associated with dysrhythmias (3).

These cardiovascular responses to sympathetic stimulation although of short duration and are of little consequence in healthy individuals, but serious complications can occur in patients with underlying coronary artery disease (4) reactive airways, (5) or intracranial neuropathology (6).

These reflexes are mediated by the cardioaccelerator nerves and sympathetic system. This response includes wide-spread release of norepinephrine from adrenergic nerve terminals and secretion of epinephrine from the adrenal medulla (7).

Esmolol is an ultra-shortacting, beta-adrenergic receptor antagonist with efficacy to provide hemodynamic stability during laryngoscopy and tracheal intubation without side-effects.(8) It inhibits Beta-1 receptors of myocardium thus attenuating positive chronotropic, to very less extent it also inhibits Beta 2 receptors of smooth muscles of vascular walls thus attenuating positive inotropic effects (9)

Dexmedetomidine is an imidazole derivative and highly selective central alpha2adrenergic receptor agonist (10). Alpha-2agonists produce hyperpolarization of noradrenergic neurons and suppression of neuronal firing in the locus coeruleus leads to decreased systemic noradrenalin release results in attenuation of sympathoadrenal responses. Although mostly used as sedative during anaesthesia, it can provide hemodynamic stability during laryngoscopy and tracheal intubation (11).

II. Method

Study Population: 60 adult ASA grade I or II normotensive patients, undergoing elective surgery

under general anaesthesia and willing to participate was the study population.

Study Design: It is a prospective randomized study. The approval for the study was obtained from the Institutional Ethics Committee.

Inclusion Criteria

Male and female of age group between 25 to 65 years. Undergoing elective surgery under general anesthesia. Weight 40 kg to 90kg. Resting systolic blood pressure less than 140 mmHg and diastolic pressure less than 90 mmHg. American Society of Anaesthesiologist Grade I and II.

Exclusion Criteria

Ischemic heart diseases or ECG abnormalities indicating ischemic heart diseases. Patients with any overt cardiac, renal, pulmonary and liver diseases. Hypertensive patients. Any Patients with history of dyspnoea on exertion of grade III or more as per NYHA guidelines. Obesity (weight more than 90kg). Pregnancy. ASA grade III or IV patients. Anticipated difficult intubation. Any contraindication of Dexmedetomidine and Esmolol.

a) Methodology

Pre-Operative Investigations and Assessment

A preoperative evaluation was carried out in all patients with demographic data like age, gender, weight and detailed clinical history, physical examination including, associated medical co-morbidities, and current medications. Blood pressure was measured at three occasions at least 1 hour apart to confirm that it fulfils the selection criteria. All routine and relevant investigations such as complete blood count, renal function test (serum electrolytes, serum creatinine, and blood urea levels), urine routine and microscopy, electrocardiogram, chest X-ray were carried out for all patients. The factors indicating difficult intubation on clinical examination were ruled out.

Pre-Operative Management

All patients received Tablet Pantoprazole 40 mg at night before surgery and 3 hours before surgery and Tablet Alprazolam 0.5 mg was given night before surgery. A 20G intravenous cannula was secured on non-dominant hand in appropriate vein in wards and intravenous fluid Ringers Lactate 500 ml as maintenance was started about 3 hours prior to surgery. About one hour prior to surgery, baseline readings were taken for pulse rate and blood pressures (Systolic, Diastolic and Mean) and were considered as preoperative baseline reading.

These patients were be randomly allocated in to either group E (Esmolol) or D (Dexmedetomidine). Once group was decided, blinding was not maintained.

In Operation Theatre

In the preoperative area, monitoring of hemodynamic parameters such as Heart Rate, Non-invasive blood pressure monitoring (NIBP), oxygen saturation (SpO2) and Electrocardiography (ECG) was done. Five ECG leads were placed on chest and Lead II, Lead aVL and Lead V were continuously observed on monitor. In operation theatre monitoring of these parameters were continued. All the 3 groups received sedation with Intravenous Midazolam 0.02 mg/kg and Fentanyl 2 mcg/kg about 15 minutes before induction. Preoygenation with 100% oxygen by using facemask in closed circuit to achieve oxygen saturation (SpO2) of 98 - 99% was done.

- For Group 'D', patients were given intravenous Dexmedetomidine infusion 1 mcg/kg over 10 minutes, 3 minutes before start of laryngoscopy.
- For Group 'E', patients were given intravenous Esmolol 1.5 mg/kg 2 minutes before start of laryngoscopy.

Induction of anaesthesia was done with Intravenous Thiopentone 5mg/kg body weight given slowly till loss of eyelash reflex is seen. Then intravenous Succinylcholine was given in dose of 2 mg/kg. Then facemask ventilation was done till twitches disappears and adequate relaxation obtained. Direct laryngoscopy was conducted by the same anaesthesia consultant for all cases, using standard McIntosh blade and an appropriate size cuffed endotracheal tube lubricated with non-anaesthetic jelly and was inserted in single attempt and cuff will be immediately inflated with air to a pressure of 25 cm of water.

After confirming bilateral equality of air entry in lungs by auscultation, the endotracheal tube was secured with the adhesive tape. Ventilation was done by IPPV on ventilator. Ventilatory setting was set to provide tidal volume of 8-10 mg/kg and respiratory rate 14/minute for 10 minutes. No noxious stimulus or surgical incision was applied over 10 minutes after intubation. Supine position was maintained. Anaesthesia was maintained using 50% nitrous oxide and 50% oxygen with Isoflurane (MAC-1.0). Hemodynamic parameters were monitored as follows: Heart rate (HR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean Arterial Pressure (MAP) by non-invasive technique.

The intervals for these measurements were:

1. Baseline (taken half an hour prior to anaesthesia)
2. Before sedation
3. After induction but before intubation
4. Immediately after intubation
5. Thereafter at 1, 2, 3, 4, 5 and 10 minutes.

After this monitoring for 10 minutes post-intubation, further operative and anaesthetic procedure were continued as per plan.

b) Statistical methods

- Statistical analysis was carried out with the help of SPSS (version 20) for Windows package (SPSS Science, Chicago, IL, USA). The description of the data was done in form of mean +/- SD for quantitative data while in the form of % proportion for qualitative (categorical) data. P-values of < 0.05 will be considered significant.
- For quantitative data, Unpaired Student's t-test was used to test statistical significance of difference between two independent group means.
- For comparison of categorical variables chi-square test was used.

III. Results

Comparision of patient variables such as age, gender and weight shows that there is no statistically significant demographical difference between group D and E. (Table 1)

Table No. 1: Comparison of Patient variables

Variables		GROUPS		p-Value
		Group D	Group E	
Age		34.8 ± 12.494	37.6 ± 12.653	0.392
Weight		65.4 ± 9.103	63.93 ± 7.856	0.506
Gender	Male	19	19	1.000
	Fenale	11	11	

Heart rate was lower in Group D as compared to Group E. There was no statistically significant difference at baseline, before sedation, after induction or immediately after intubation. Thereafter heart rate was statistically significant lower in group D. (Table 2)

Table No. 2: Intergroup Comparison of mean Heart Rate between Group D and E

	Group D	Group E	p-Value
	Mean ± SD	Mean ± SD	Group D vs E
Baseline	80.60 ± 11.267	80.63 ± 6.891	0.990
Before Sedation	80.57 ± 11.392	81.60 ± 7.233	0.689
After Induction	79.67 ± 11.081	79.33 ± 10.410	0.912
Immediately after Intubation	84.53 ± 10.679	88.67 ± 7.747	0.113
1 min	82.53 ± 9.365	88.77 ± 8.016	*0.017**
2 mins	80.87 ± 9.566	87.53± 7.519	*0.014**
3 mins	79.71 ± 9.158	86.53 ± 7.615	*0.005**
4 mins	78.13 ± 9.213	84.37 ± 7.308	*0.014**
5 mins	76.97 ± 9.427	82.73 ± 7.759	*0.024**
10 mins	75.23 ± 9.957	80.93 ± 7.843	*0.030**

**statistically significant*

SBP was lower in Group D as compared to Group E. There was no statistically significant difference at baseline, before sedation or after inductionThereafter SBP was statistically significant lower in group D. (Table 3)

Table No. 3: Intergroup Comparison of mean Systolic Blood Pressure between Group D and E

	Group D	Group E	p-Value
	Mean ± SD	Mean ± SD	Group D vs E
Baseline	121.33 ± 9.260	120.80 ± 9.368	0.807
Before Sedation	119.90 ± 9.437	119.93 ± 9.584	0.989
After Induction	121.50 ± 9.332	117.07 ± 8.998	0.067
Immediately after Intubation	124.50 ± 9.569	155.07 ± 12.086	*0.000**
1 min	121.43 ± 8.912	150.73 ± 10.696	*0.000**
2 mins	118.33 ± 8.636	145.53 ± 9.912	*0.000**
3 mins	117.10 ± 8.385	141.00 ± 9.040	*0.000**
4 mins	114.87 ± 8.386	133.53 ± 8.460	*0.000**
5 mins	112.67 ± 8.547	126.27 ± 9.752	*0.000**
10 mins	111.30 ± 8.567	120.40 ± 8.869	*0.000**

**statistically significant*

DBP was lower in Group D as compared to Group E. There was no statistically significant difference at baseline, before sedation or after induction Thereafter DBP was statistically significant lower in group D except at 10 minutes after intubation, where difference was not statistically significant. (Table 4)

Table No. 4: Intergroup Comparison of mean Diastolic Blood Pressure between Group D and E

	Group D	Group E	p-Value
	Mean ± SD	Mean ± SD	Group D vs E
Baseline	77.73 ± 8.832	76.93 ± 9.927	0.783
Before Sedation	78.60 ± 7.445	76.83 ± 9.745	0.498
After Induction	78.03 ± 7.337	76.43 ± 11.352	0.566
Immediately after Intubation	79.80 ± 7.513	89.53 ± 8.016	*0.000**
1 min	79.03 ± 7.712	86.37 ± 8.869	*0.004**
2 mins	77.37 ± 7.513	84.23 ± 9.591	*0.008**
3 mins	75.47 ± 7.628	84.23 ± 9.591	*0.006**
4 mins	73.60 ± 7.686	80.63 ± 9.608	*0.009**
5 mins	72.00 ± 8.077	77.90 ± 9.532	*0.033**
10 mins	69.73 ± 8.292	73.80 ± 8.919	0.121

**statistically significant*

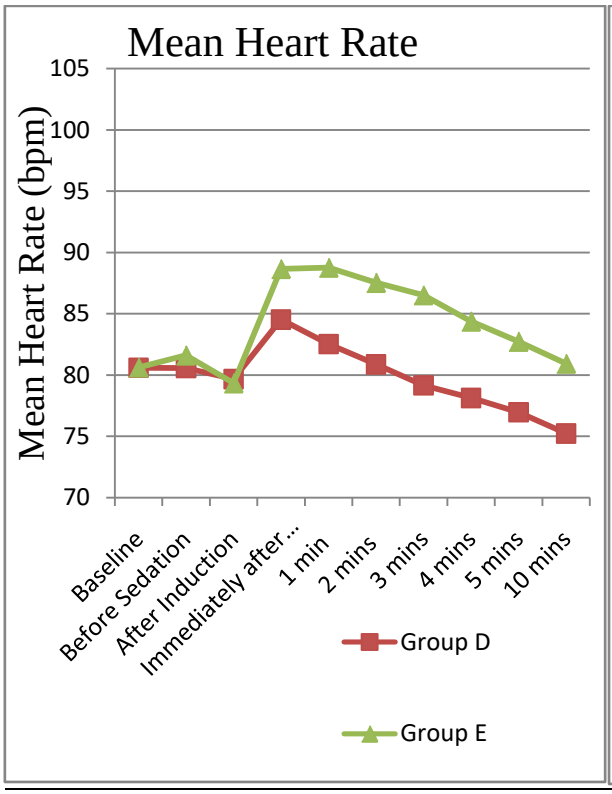
MAP was lower in Group D as compared to Group E. There was no statistically significant difference at baseline, before sedation or after induction Thereafter DBP was statistically significant lower in group D except at 10 minutes after intubation, where difference was not statistically significant. (Table 5)

Table 5: Intergroup Comparison of mean MAP between Group D and E

	Group D	Group E	p-Value
	Mean ± SD	Mean ± SD	Group D vs E
Baseline	92.50 ± 12.857	91.53 ± 6.485	0.738
Before Sedation	93.87 ± 12.005	91.60 ± 6.431	0.468
After Induction	96.17 ± 11.308	91.33 ± 6.787	0.084
Immediately after Intubation	97.37 ± 10.227	109.80 ± 7.911	*0.000**
1 min	95.83 ± 9.706	106.00 ± 8.383	*0.000**
2 mins	93.00 ± 9.798	102.97 ± 8.336	*0.000**
3 mins	90.67 ± 9.185	99.63 ± 7.792	*0.000**
4 mins	89.00 ± 9.620	97.00 ± 7.297	*0.001**
5 mins	87.03 ± 9.301	92.43 ± 6.951	*0.012**
10 mins	85.63 ± 9.338	88.57 ± 7.055	0.174

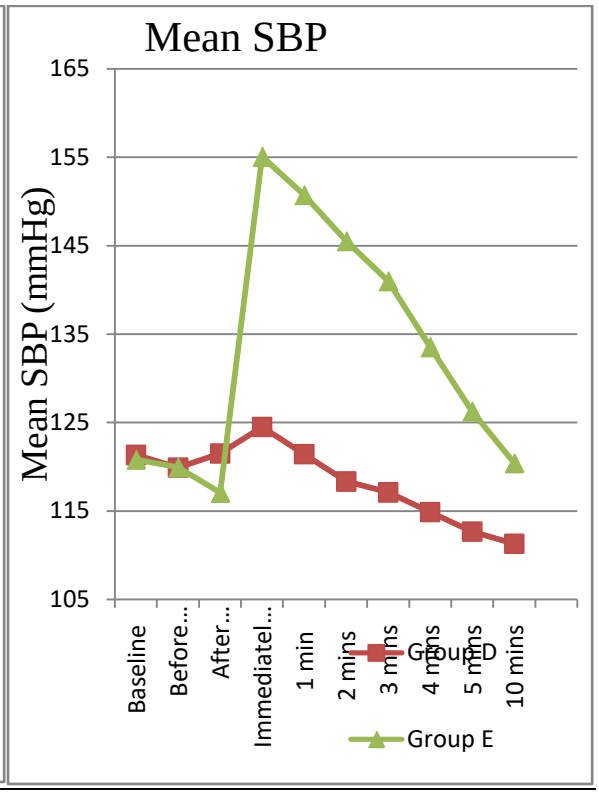
**statistically significant*

HR in Group D and E



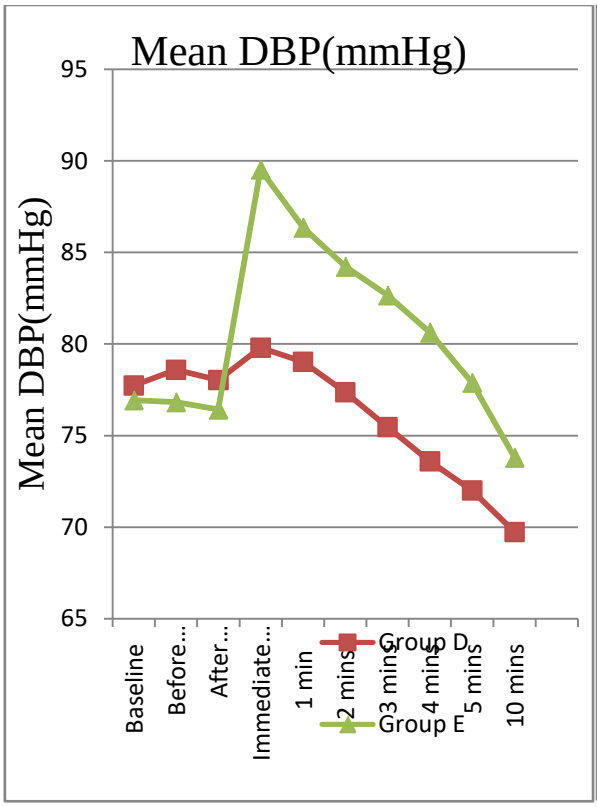
Graph No. 1: Comparison of Mean

SBP in Group D and E

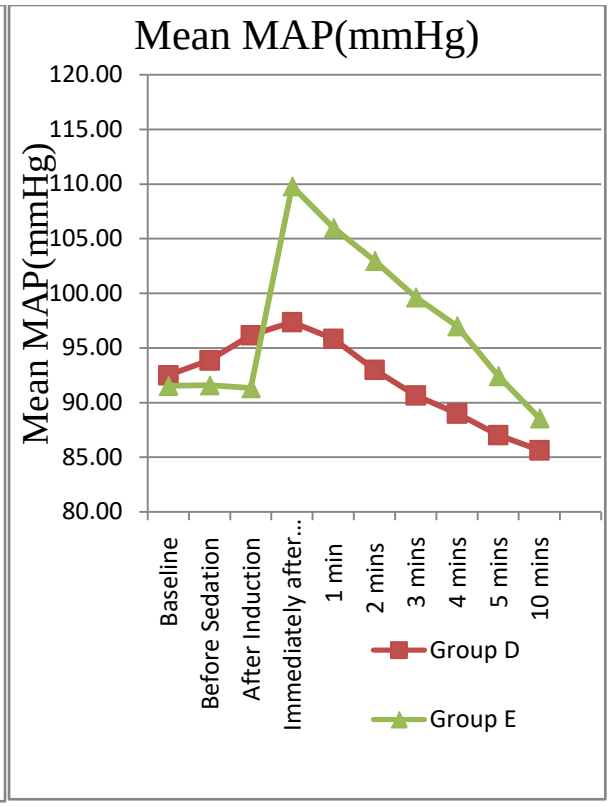


Graph No. 2: Comparison of Mean

DBP in Group D and EMAP in Group D and E



Graph No. 3: Comparison of Mean



Graph No. 4: Comparison of Mean

IV. Discussion

There is well recognised, hemodynamic response which is characterized by tachycardia and hypertension due to manipulation in the area of the larynx, during laryngoscopy and endotracheal intubation. Stimulation of mechanoreceptors in the pharyngeal wall, epiglottis and vocal cords, is thought to be the cause for this hemodynamic response.

Cardiovascular pressor response following laryngoscopy and tracheal intubation has been investigated extensively for a long time and reported these changes. (12).Myocardial ischemia might occur during the induction-intubation sequence in patients with coronary artery disease. Intraoperative ischemia has been associated with a high rate of perioperative myocardial infarction. (13) During procedure like direct laryngoscopy involving severe sympathetic stimuli prevention of tachycardia, hypertension and rise in total oxygen consumption may prove beneficial in patients with limited cardiac reserve (14).

Esmolol is effective, in a dose-dependent manner, in the attenuation of the sympathomimetic response to laryngoscopy and intubation. Shrestha *et al* (15) noted that doses of Esmolol higher than 1.5 mg/kg did not completely prevent the pressor response to laryngoscopy and intubation. Sum *et al* (16) has also found a similar effect in addition to increase in intracranial pressure.

Dyson et al (17) noted that Esmolol in doses 1 mg/kg was insufficient to control the increase in systolic blood pressure compared to 1.5 mg/kg and 2 mg/kg which controlled both systolic blood pressure and heart rate, but 2 mg/kg dose produced significant decreases in systolic blood pressure.

Miller et al (18) in their study have reported that 100 mg of single bolus dose of Esmolol was effective for controlling the hemodynamic response to tracheal intubation in a Canadian multicentre trial.

Study done by Sanjeev Singh et al (19) comparing Esmolol also showed significant increase in Heart Rate after intubation and remained significantly high at 3 and 5 mins. They also found increase in SBP, DBP and MAP from the baseline in after Esmolol at 1 min with onward decreases at 3 and 5 min respectively after intubation. Kindler et al (20) also found that Esmolol administration before laryngoscopy was insufficient to control HR and SBP after intubation. Oxorn et al (21) concluded that Esmolol in bolus doses of 100 mg and 200 mg affects solely the chronotropic response in a significant manner, more so than hypertensive response.

Dexmedetomidine is a highly selective and specific alpha two adrenergic agonist which produces its action by decreasing the catecholamine release from locus coeruleus in the brain. It decreases the cerebral blood flow (CBF) while preserving the CBF-cerebral

metabolic rate coupling, decreases intracranial pressure. (22,23,24) It also decreases sympathetic tone and their preoperative use has been shown to blunt the hemodynamic responses to laryngoscopy and intubation. (25)

Sagiroglu *et al.* concluded that the overall control of hemodynamic responses to tracheal intubation were better with Dexmedetomidine 1 μg/kg as compared to Dexmedetomidine 0.5 μg/kg (26). Laha et al (27) in their study compared Dexmedetomidine 1 μg/kg with control and concluded that Dexmedetomidine effectively blunted the hemodynamic responses during laryngoscopy, and reduced anaesthetic requirements.

Reddy et al (28) observed that Esmolol was not as effective as Dexmedetomidine in attenuating the hypertensive response to tracheal intubation. In fact, after use of Esmolol for intubation a significant increase in SBP was observed and compared to Dexmedetomidine the increase in SBP was greater and more significant in this study.

Srivastava et al (29) also found Systolic blood pressure values were statistically significantly lower in the Dexmedetomidine after induction and all time observation of intubation, when compared with Esmolol to the baseline values. They also observed statistical significant increase in Blood pressure after intubation at 1, 2 and 3 min only after intubation. Although Esmolol was considered to have significant effect on both tachycardia and hypertensive response following ET intubation,

Unlike our study, Liu et al (30) who used Esmolol infusion to control hemodynamic responses associated with intubation, found significant decreases in a SBP prior to induction and post-intubation, compared to the placebo group. This could be because in their study patients received infusion rather than bolus like our study.

In present study, pretreatment with Esmolol 1.5 mg/kg attenuated, but did not totally obtund, the cardiovascular response to tracheal intubation after induction of anesthesia and these findings are similar with previous studies. β-adrenoceptor blockade minimizes increase in HR and myocardial contractility by attenuating the positive chronotropic and inotropic effects of increased adrenergic activity. But it failed to effectively attenuate hypertensive response to intubation.

Our study demonstrated that the use of Dexmedetomidine was more effective than Esmolol in decreasing the cardiovascular responses to laryngoscopy and intubation.

V. Conclusion

In Normotensive patients requiring general anesthesia with intubation, after induction with Fentanyl and Thiopentone, and Succinylcholine as muscle relaxant, we found that intravenous Dexmedetomidine 1ug/kg is better drug to attenuate hemodynamic response to laryngoscopy and intubation as compared to intravenous Esmolol 1.5mg/kg.

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Ethical approval: Approval was obtained from hospital's ethical and scientific committee.

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It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

Tips for writing a good quality Medical Research Paper

1. Choosing the topic: In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. Think like evaluators: If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.

6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. Make every effort: Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. Know what you know: Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.

Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.

Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection.

Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

Written material: You may discuss this with your guides and key sources. Do not copy anyone else's paper, even if this is only imitation, otherwise it will be rejected on the grounds of plagiarism, which is illegal. Various methods to avoid plagiarism are strictly applied by us to every paper, and, if found guilty, you may be blacklisted, which could affect your career adversely. To guard yourself and others from possible illegal use, please do not permit anyone to use or even read your paper and file.

Criterion for Grading a Research Paper (Compilation) by Global Journals

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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