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ORIGINAL ARTICLES

CASE REPORT

ORIGINAL ARTICLE

Comparison of King Vision video laryngoscope with Macintosh laryngoscope in endotracheal intubation under general anesthesia: A randomized controlled study

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Background: The majority of intubations worldwide are still carried out using a conventional approach. However, alternative intubation systems with video, optical, or fiber-optic imaging that have several advantages over direct laryngoscopy have arisen in the recent time. The King Vision video laryngoscope is the newest gadget in a long series, which provides an "excellent vision" for intubation using video and digital technology. Therefore, we compared the efficiency of the King Vision video laryngoscope and the Macintosh laryngoscope, when used by experienced anesthesiologists on adult patients with varying intubating conditions, in a prospective randomized controlled clinical trial. **Methods:** A total of 80 patients with the American Society of Anesthesiologists grade of I, II, and III were included in the study. Out of 80 patients, two groups were created consisting of 40 patients in each group. Group K was intubated with King Vision video laryngoscope while Group M with Macintosh laryngoscope. Intubation success rate, time to intubation, ease of intubation, and hemodynamic parameters while intubation and complication related to intubation were analyzed in the study. **Results and Conclusion:** First-pass intubation success rates were similar for both groups ($P > 0.05$). The mean tracheal intubation time (time of tracheal intubation) was 26.3 s in the ML group and 24.75 s in the KVVL group. However, the difference in time to intubation was similar when unsuccessful intubation attempts were excluded ($P < 0.001$). Hemodynamically, there was no significant change between these two groups. The King Vision video laryngoscope is equally efficient and safe as Macintosh laryngoscope. With lower need for retreat, it provides a comprehensive panorama laryngeal assessment and less manipulation of the airway, King Vision video laryngoscope has a comparable safety profile with Macintosh laryngoscope.

KEY WORDS: King Vision video laryngoscope, Macintosh laryngoscope, hemodynamic changes, ease of intubation, time to intubate, intubation success rate

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INTRODUCTION

Airway management is the primary responsibility of anesthesiologists: Ensuring, preserving, and securing it during anesthesia. Failure to control airways can lead to disastrous results; death or worse; and brain damage. Most anesthesia mishaps occur in succession of anesthesia induction.[1]

The majority of intubations worldwide are still carried out using such a conventional approach despite fast progress in medical technology; nevertheless, direct laryngoscope angle is 15° and restricted by the patient's oropharyngeal structure, secretion, and location.[2] This method is a traditional procedure.

Since Kirstein originally detailed the procedure in 1895, the benefit of the right head-and-neck position for improved laryngeal vision was known. Inadequate placement can lead to protracted or failing intubation because of the improper imaging of the larynx.[3]

Alternative intubation systems with video, optical, or fiber-optic imaging that have several advantages over direct laryngoscopy have arisen.

The King Vision video laryngoscope is the newest gadget, which provides an "excellent vision" for intubation using video and digital technology. It consists of two blades, one with a channel and the other without a channel. The display is a diode emitting organic light (organic light-emitting diodes) design with a remarkable clarity and resolution.[4] The channel blade needs to open the mouth at least 1.8 cm, while the not channel blade needs to be open at least 1.3 cm.[5-8]

Therefore, we plan to compare the efficacy of indirect laryngoscopy by King Vision video laryngoscopy with direct laryngoscopy using the conventional Macintosh with regard to visualization of the laryngeal view, speed of intubation, and intubation success rate.

MATERIALS AND METHODS

After obtaining local Ethics Committee approval, a hospital-based prospective randomized clinical study was carried out in Rohilkhand Medical College and Hospital, Bareilly. Informed and written consent were taken from each patient before the procedure and 80 patients of the American Society of Anesthesiologists (ASA) Grade I and II posted for elective surgery under general anesthesia age group of 18–60 years were randomly distributed and allocated in two different Groups K and M.

Group M: These patients intubated using the conventional Macintosh blade number 3.

Group K: While these were intubated by KVVL.

A through systemic examination was carried out to detect the presence of any systemic disorder. All patients were maintained at nil per os for 6–8 h before the operation. Tablet 150 mg ranitidine and 0.25 mg alprazolam tablet were administered night before operation.

Patients were linked with standard monitors, including the electrocardiography, non-invasive blood pressure (BP), and pulsation oximeter, on arriving at the operation theater. All of them were exposed to the same anesthetic procedure. Fentanyl 1 μg/kg and propofol 1.5–2 mg/kg were used. Rocuronium 0.6 mg/kg was given before the orotracheal intubation. Orotracheal intubation was done using a chosen intubation system for each group with an endotracheal tube loaded over an endotracheal style and after complete muscle relaxation. Tracheal intubation was performed by consultant anesthesiologist who had learned and performed at least 20 intubations with the new device in clinical setting before the study.

For an easy intubation, we had scored it 1 while for difficult, we had scored it 2.

"The time for intubation (in seconds) was then measured from taking up the device to removing the laryngoscope after successful tracheal intubation. Heart rate (systolic, diastolic, and mean) SpO2 was measured at eight specified times, namely, T1 = Baseline before anesthesia induction, T2 = After anesthetic induction, T3 = Before laryngoscopy, T4 = Immediate after intubation, T5 = 1 min of intubation in the trachea; T6 = 3 min after intubating the endotracheal; T7 = 5 min after intubation; and T8 > after 10 min endotracheal intubation."

At the end of the surgery, reversal was done with inj. neostigmine 0.05 $mgkg^{-1}$/iv and inj. glycopyrrolate 0.008 $mgkg^{-1}$/iv. Pharyngotracheal suction was done. After the patient was able to keep his eyes open, elevate head, and breathe normally, he/ she was extubated and shifted to ward.

Statistics

Data were summarized as mean ± standard deviation with confidence interval of 95% or as percentages. Statistical analysis was performed by SPSS 22.0. Numerical variables were normally distributed and were compared by unpaired "*t*"-test. $P < 0.05$ was considered as statistically significant and <0.001 was considered as statistically highly significant.

RESULTS

Time to Intubate

Mean intubation time of patients in Group K was 24.75 s and in Group M was 26.3 s. There was a statistically significant difference in mean intubation time of patients among the two groups ($P = 0.3109$), as shown in Table 1.

Ease of Intubation

Ease of intubation was based on score 1 and 2 in both groups. Out of 40 patients in Group K, 34 patients scored 1 (easy intubation) and rest six scored 2 (difficult intubation) while in Group M, 32 patients scored 1 and rest eight scored 2, as shown in Table 2.

Table 1: Time to intubate

Parameter	Mean	Mean difference	P value	*t*-value
KVVL	24.75	1.55	0.3109	1.020
ML	26.3			

Intubation Success Rate

The successful intubation rate was 100% in both Group K and Group M. The 1st attempt success rate in Group K was 100% and 80 % in Group M. The 2nd attempt success rate was 100% in Group M. (40/40) Patients proceed in 1st attempts attempt in Group K and (32/40) patients proceed in 1st attempt and (8/40) in 2nd attempt in Group M. There was no statistically significant difference in successful number of attempts of patients in either group (P = 0.7462).

Hemodynamic Changes

Heart rate

Baseline heart rates, in both Groups K and M, were statistically insignificant, heart rates reduced after induction with propofol and before intubation but increased after intubation and at 1 min. Heart rate reduced below baseline after 5 and 10 min of intubation when the patient was in general anesthesia and the difference in heart rates in Groups K and M remained statistically insignificant throughout the intervals [Figure 1].

Systolic BP (SBP)

Baseline SBP, in both Groups K and M, was statistically insignificant, SBP reduced after induction with propofol and before intubation but increased after intubation and at 1 min. SBP reduced below baseline after 5 and 10 min of intubation when the patient was in general anesthesia and the difference in SBP in Group K and M remained statistically insignificant throughout the intervals [Figure 2].

Table 2: Ease of intubation

Parameter	Mean	Mean difference	*P* value	*t*-value
KVVL	1.18	0.02	0.821	0.226
ML	1.2			

Diastolic BP (DBP)

Baseline DBP, in both Groups K and M, was statistically insignificant, DBP reduced after induction with propofol and before intubation but increased after intubation and at 1 min. DBP reduced below baseline after 5 and 10 min of intubation when the patient was in general anesthesia and the difference in DBP in Groups K and M remained statistically insignificant throughout the intervals [Figure 3].

Mean arterial pressure (MAP)

Baseline MAP, in both Groups K and M, was statistically insignificant, MAP reduced after induction with propofol and before intubation but increased after intubation and at 1 min. MAP reduced below baseline after 5 and 10 min of intubation when the patient was in general anesthesia and the difference in MAP in Groups K and M remained statistically insignificant throughout the intervals [Figure 4].

DISCUSSION

The Macintosh laryngoscope is used for around 72 years for intubation and is considered to be the main standard in trachea cannulation. The latest device added to the competition is the King Vision video laryngoscope. One employs direct vision and another provides an indirect image with magnification. Macintosh requires uniocular view, whereas King Vision provides a convenient and binocular view.

This study was meant to assess laryngoscopes of Macintosh and King Vision in terms of efficacy and safety for the intubation

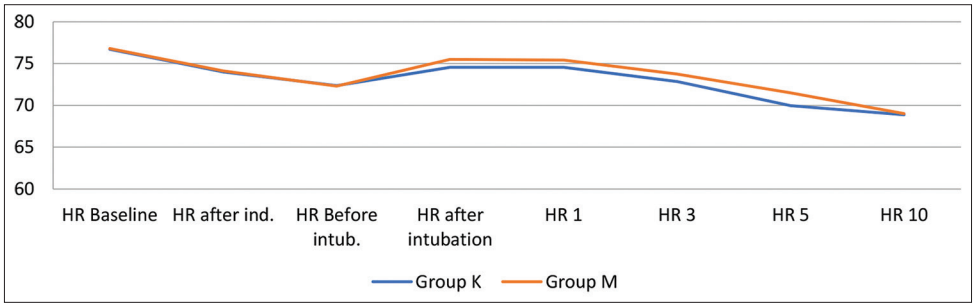

Figure 1: Heart rate

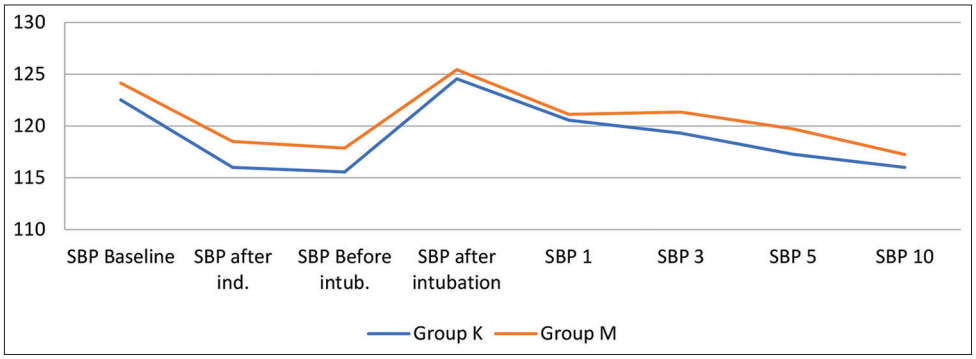

Figure 2: Systolic blood pressure

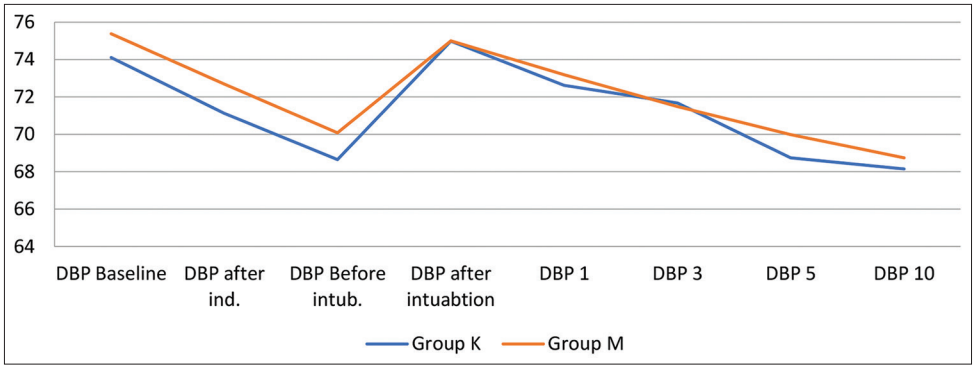

Figure 3: Diastolic blood pressure

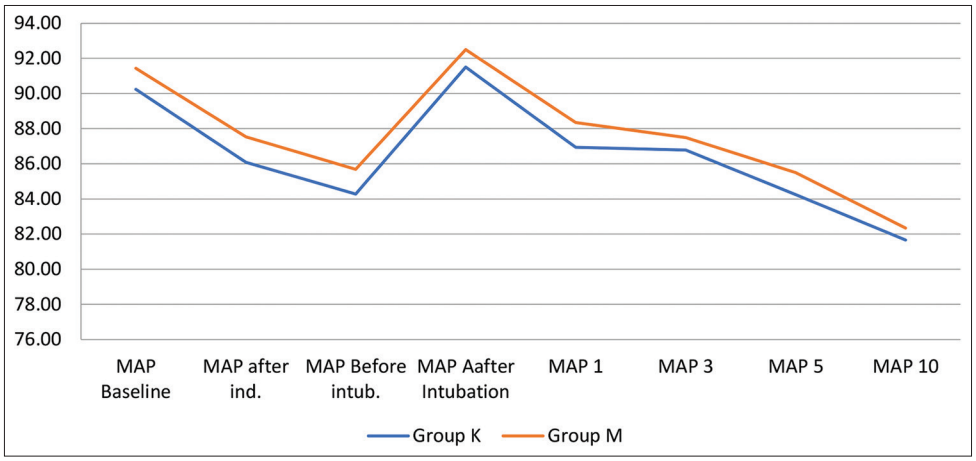

Figure 4: Mean arterial pressure

by experienced anesthesiologists of anticipated normal/difficult airways.

The mean tracheal intubation time was 26.3 s in the ML group and 24.75 s in the KVVL group. In general, the intubation time is longer with video laryngoscopes than direct Macintosh blade.

It was documented, by Murphy *et al.*, that intubation time on a manikin was 3.4 s quicker than ML with KVVL.[9] Jungbauer concluded a study and state that when video laryngoscopy compared with direct laryngoscopy for difficult intubations, provides a significantly better view of the cords, a higher success rate, faster intubations, and less need for optimizing maneuvers.

No. of Attempts

In the first attempt, however, all KVVL cases were intubated although eight ML patients required two success tries. While this is statistically not significant, but may be clinically significant, the reason is a poor visualization of the airway axes and the lack of alignment.

Ease of Intubation

We have used verbal numerical scale for assessing the ease of intubation [10-13]. The mean score is 1.2 with the ML and 1.18 with the KVVL groups. We have used verbal numerical scale for assessing the ease of intubation. Statistically both groups were insignificant. Although king vision video laryngoscope provide better view as compared to Macintosh.

Hemodynamic Changes

After premedication with fentanyl and midazolam, the heart rate in both groups decreased by basal values and decreased further after induction. Immediately following intubation in both groups practically grew to baseline value. The heart rate rose after intubation to a maximum of 1 min with ML and KVVL after intubation. Then, the induction value began to decline in both groups at around 3–5 min. Both groups were equivalent and did not show substantial importance.

For both groups, systolic, diastolic, and mean BP decreased from basal to pre-medicate and after induction to lower (lowest). After intubation, they all increased from the PT0 post-induction value to the PT1 peak to stabilize around 5 min after intubation. The two groups were comparable and neither of them was significant.

In support of our study, comparable results were shown with the King Vision video laryngoscope Group K Ali *et al*. in their study, where the heart rate and MAP were elevated after intubation and reverted to the baseline in 5 min. In favor of our study, similar results were also shown by Biswal *et al.*, Ahmad *et al.,* and Singhal *et al*.

CONCLUSION

The observation of the present study concludes that.

Although KVVL is a type of indirect laryngoscope and has a longer learning curve and more costly, it provides better laryngeal view as compared to conventional laryngoscope, it is helpful in condition where minimal neck manipulation is needed, as in case of cervical injury and instability.

SUMMARY

The King Vision video laryngoscope is equally efficient and equally safe in terms of safety for patients under general anesthesia with Macintosh laryngoscope.

However, the high purchase price for the equipment, the reduction of fragile optics, circuitry, and huge recurring cost to the jet blade can prevent its overall application.

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Original Article

A study regarding D-dimer as a biomarker for disease severity in COVID-19 patients in tertiary care hospital of Southwest Bihar

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Conflicts of Interest: None declared.

Background: Coronavirus disease has been declared a Public Health Emergency of International Concern. After the outbreak of the coronavirus disease 2019 (COVID-19) over 120,941,264 cases of coronavirus have been reported from December 2019. We aim to assess the use of D-dimer as a biomarker for disease severity and clinical outcome to improve the management of COVID-19 patients. **Aim and Objective:** The aim of the present study was to evaluate whether elevated D-dimer levels could predict the disease severity and mortality in patients with COVID-19. **Methods:** Patients with laboratory-confirmed COVID-19 were prospectively enrolled in Narayan Medical College and Hospital from September 12, 2020 to April30, 2021. **Results:** In the present study the majority of patients were men in the 40–59 age group with a D-Dimer value of between 500 and 1000 ng/ml. The majority of female patients were in the 40–59 age group with a D-Dimer dose of between 1000 and 2000 ng/ml. However, the difference was found to be statistically significant (P <0.05) at a 95% significance level. D-dimer at a reception >2.0 µg/mL (fourfold increase) can effectively predict mortality in patients with COVID-19, indicating that D-dimer may be the first and most helpful marker of improving Covid-19 patient management. **Conclusion**: D-dimer was commonly elevated in COVID-19 positive patients. D-dimer levels correlate with disease severity and are a reliable prognostic marker for in-hospital mortality in patients admitted for COVID-19.

KEY WORDS: Biomarker, corona virus disease, D-dimer, SARS-CoV-2, severity

INTRODUCTION

Coronavirus has been declared a Public Health Emergency of International Concern. On December 31, 2019, the Wuhan Municipal Health Commission, Hubei Province, China, reported the presence of 27 cases of patients with undiagnosed etiology, related diseases, and the local market for wildlife and seafood.[1] After a laboratory investigation, on January 7, 2020, the causative agent of these diseases was identified, identified as the new CoV in 2019, and officially designated by the World Health Organization (WHO) as 2019-nCoV.[2] Subsequently, the Global Infectious Disease Development Committee renamed 2019-nCoV as SARS-CoV-2.[3,4] COVID was declared a pandemic by the World Health Organization on March 11, 2020. In India, the first case of coronavirus disease 2019 (COVID-19) was reported on 30 January 2020 in Kerala.[23]

Coronaviruses (CoVs) are the largest group of viruses in the family Coronaviridae,[5,6] introducing a single type of RNA genome.[7] The genome is surrounded by a helical capsid and a lipoprotein envelope containing several spicules of glycoprotein which together give the virus the appearance

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of a crown. Thus comes the word "corona," in Latin, meaning crown.[8] When infecting people, CoVs can cause a variety of diseases, from upper respiratory infections such as the common cold, liver, enteric, neurological, and lower respiratory infections such as pneumonia, bronchitis, and acute respiratory syndrome (SARS).[5,7,9] SARS can be caused by the strongest respiratory coronavirus (SARS-CoV),[10] the Middle East respiratory coronavirus (MERS-CoV),[11] and more recently the coronavirus of - acute respiratory syndrome 2 (SARS-CoV-2).[1]

The SARS-CoV-2 infection creates a profound inflammatory response that causes coagulation breakdown. Cascade coagulation rehabilitation in COVID-19 patients is associated with a non-invasive condition and adverse clinical outcomes including death. Previous studies of community-acquired pneumonia (CAP) and chronic obstructive pulmonary disease (COPD) patients have shown that D-dimer levels are high in severe cases and can be used as a prognostic biomarker,[1,2,11] and D-dimer> I-1 μg/ml is one of the leading causes of death in older patients with COVID-19.[10] D-dimer is a biomarker of fibrin formation and degradation that can be measured in whole blood or plasma. Healthy people have lower levels of D-dimer circulation, and higher levels are found in cases associated with hypercoagulation and increased fibrinolytic activity. Coagulopathy was reported, and elevated D-dimer was observed in 3.75–68.0% of COVID-19 patients.[6,9,10] Currently, the best laboratory diagnostic marker of COVID-19 - corresponding to hemostatic abnormalities (CAHA) is considered D-dimer.

However, the role of D-dimer in COVID-19 patients has not been fully investigated. Therefore, the aim of this study was to evaluate the risk factors in clinics to quickly predict the severity and death of COVID-19 and to apply it. In this study, we demonstrated D-dimer levels in patients and also evaluated the role of D-dimer as a biomarker of disease severity and clinical outcome. Our study may help establish a different treatment and individual treatment route for COVID-19 patients.

MATERIALS AND METHODS

Study Design

A prospective study conducted at Narayan Medical College and Hospital (Sasaram, Bihar) on laboratory-confirmed COVID-19 patients between September 10, 2020, and April 30, 2021.

Laboratory Assay and Interventions

A total of 241 blood samples were collected in light blue color Vacutainer containing Sodium citrate as anticoagulant for the estimation of D-dimer level (As per the WHO guidelines on drawing blood: best practices in phlebotomy 2010, Geneva: WHO; 2010) from each patient at the time of admission. Plasma separated from the samples centrifuged at 3000 rpm for 5min and test was carried out in Fully Automated Immunoassay System- VIDAS using enzyme-linked fluorescence assay technology as per manufacturer instruction at the time of presentation and during the hospital stays every 48 and 72 hourly till discharge or death.

Statistical Analysis

Collected data were entered in MS Excel spreadsheet, coded appropriately and later cleaned for any possible error and analyzed in Statistical Package for Social Studies for windows version 22.0. All tests were performed at 95% significance level, thus an association was significant if the value was <0.05 ($P < 0.05$).

RESULTS

Studies show that, Of the 241 patients in total, 160 of the patients (66.4%) were male, among them most 80 (33.2%) were in the 40–59 age group with a majority of 51 (31.875%) with D-Dimer value ranging from 500 to 1000 ng/ml. Of the 81 women aged 40–59 most of the 22 (27.2%) had D-Dimer levels ranging from 1001 to 2000 ng/ml. as shown in Tables 1 and 2.

The distribution of patients in terms of D-dimer value for their survival and ICU admission, suggests that non-survivors had a higher D-dimer for ICU admission than survivors (discharged). As shown in Tables 3 and 4.

However, the difference was found to be statistically significant (P <0.05) at a 95% significance level.

Table 1: Gender and age of the patient

Gender	Age of the patient						Total
	0–19	20–39	40–59	60–79	80–99	100 and above	
Male	1	34	80	38	6	1	160
Female	2	12	41	25	1	0	81
Total	3	46	121	63	7	1	241

Table 2: D-dimer value (ng/ml) and gender

	Gender		Total
	Male	Female	
D-dimer value (ng/ml)			
<500	37	17	54
500–1000	51	15	66
1001–2000	28	22	50
2001–3000	14	4	18
3001–4000	8	7	15
4001–5000	1	5	6
5001–10000	8	9	17
>10000	13	2	15
Total	160	81	241

Table 3: D-dimer value (ng/ml) and survivor/dead

	Survivor/Dead		Total
	Survived	Dead	
D-dimer value (ng/ml)			
<500	54	0	54
500–1000	65	1	66
1001–2000	49	1	50
2001–3000	16	0	16
3001–4000	13	0	13
4001–5000	5	1	6
5001–10000	8	11	19
>10000	8	9	17
Total	218	23	241

Table 4: D-dimer Value (ng/ml) and patient admitted in ICU and discharged/death

	Patient admitted in ICU		Total
	Yes	No	
D-dimer value (ng/ml)			
<500	0	54	54
500–2000	3	111	114
2001–5000	31	3	34
5001–10000	8	0	8
>10000	8	0	8
Discharged			
Total	51	167	218
Death			
Total	23	0	0
Total	74	167	241

DISCUSSION

A key finding of this study is that in the acceptance of a D-dimer level >2.0 μg/mL, it was an independent predictor of hospital mortality in patients with COVID-19. These findings provide a well-established set of cuts to identify those COVID-19 patients with poor prognosis at baseline. Elevated D-dimer levels have been reported as one of the most common laboratory symptoms noted in COVID-19 patients requiring hospitalization. The findings of the study show similar results to that in various studies conducted by Guan *et al*.,[9] Ning *et al*.,[1] Fei *et al*.,[3] Huang *et al*.[5] D-dimer levels at admission were higher in patients requiring critical care support than those who did not need (median, 0.5 μg/mL).

Elevated D-dimer levels indicate a hypercoagulable condition in a patient with COVID-19, which may be caused by a number of factors: First, viral infections are often accompanied by a violent inflammatory response and inadequate control of the anti-inflammatory response.[4] It can cause endothelial cell dysfunction, which leads to overproduction of thrombin.[12] Second, hypoxia found in severe COVID-19 can promote thrombosis by not only increasing blood viscosity, but also a hypoxia-inducible-dependent signaling pathway.[13,14] Third, hospitalized patients, especially severe COVID-19 patients, were more likely to have age, lower status, prolonged bed rest, and aggressive treatment, Which were all risk factors for dealing with hypercoagulation or thrombosis.[15-17] As evidence, segregation of a critical patient's lung with COVID-19 reported closure and formation of micro-thrombosis in small lung vessels.[18] In fact, some patients may develop sepsis-induced coagulopathy or even develop intravascular coagulation.[1,19] In all cases, high D-dimer was always associated with adverse events.[20-22]

This study has several limitations. First, our study may have a preferred option because it was a single entity, even if it had sufficient potential to detect significant differences between groups at death. Second, a multi-parameter prediction model including D-dimer and other variables can provide a better predictive capability for COVID-19 patients.

CONCLUSION

D-dimer at a reception >2.0 μg/mL (four times more than normal) can effectively predict mortality in patients with COVID-19, indicating that the value of D-dimer could be the first and most helpful marker of improving COVID-19 patient management.

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ORIGINAL ARTICLE

Medical negligence and Indian law - An overview

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Introduction: The term medical negligence is an omnibus one, which has come in vogue to refer to wrongful actions or omissions of professional acts in the field of medicine, in pursuit of their profession, while dealing with patients. However, surprisingly this term is not validated anymore in our Indian law. It is a surprise to know that no one in the legal or medical system is clear or aware of what is "minimum standard" of skill which must be there, and to more surprise, all cases are decided and awarded based upon these parameters of skill of minimal standard, but nobody knows what that minimal standard is. Medical science is a science of probability and art of uncertainty, no one in the medical science can declare what would be the definite results of treatment given to a patient, even after best possible efforts. **Discussion:** Negligence is never intentional it is because of the absence of mind not a wilful act, no service giver or any person giving any advise is free from chances of being negligent than why only doctors or medical professionals are victim of consumer laws, alike other profession, this is neither justice to doctors nor beneficial for peoples in the country. **Conclusion:** Medical science is a science of probability and art of uncertainty, no one in medical science can declare what would be the definite results of treatment given to a patient, even after the best possible efforts.

KEY WORDS: Consumer protection act, The Medical Council of India (MCI), National Medical Commission, Indian Penal court (IPC)

INTRODUCTION

Long before an eminent jurist in the UK, Lord Denning has said if you deal a doctor with a pistol of law on his temple, he will protect himself first, rather that pain or pocket of his patients.

Medical profession which is considered best noble service to whole humanity, now a day's kept in the category of business, relationship between doctors and his patients which was of faith and believes now converted into doubts and suspicion.[1]

Why there is such a drastic change in practise of this noble profession and the perception of general peoples particularly in India.

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Whether doctors have become more negligent or legal system of this country deals them now differently.

In the perspective of recent legal changes, we will try to analyze whether the recent changes in our legal system is really good, unbiased or even helpful for doctors as well as their so called consumer patients or otherwise.

Negligence is not a new term for legal system of any civilized population; however, it came to the eyes of law maker of our country for its application over medical professionals after the implementation of Consumer Protection Act (CPA) in 1986, onwards.

A noble profession of service of mankind thereafter considered and converted as relationship like business or relationship of consumer and service provider. Is that a welcome step, an unbiased pure and pious form of law, beneficial to common person, the patient or even good for society we will try to evaluate.

Leaving aside the legal language, one should know that what is negligence or a medical negligence.

The term medical negligence is an omnibus one, which has come in vogue to refer to wrongful actions or omissions of professional acts in the field of medicine, in pursuit of their profession, while dealing with patients. However, surprisingly this term is not validated anymore in our Indian law.

In simple word "what was required but not done or committed, and what has been not required has been done" any such act or omissions is defined as negligence and if done or omitted in medical field or during treatment of patient, by his doctor (the service provider), is a case of medical negligence.

Any such medical negligence if caused harm or loss to the patient is now compensable under provisions of CPA.

A doctor is expected to be a skilful person by his training in medical field and owns a responsibility of proper care to his patients if he accepts relationship as of the treating doctor.

Word "Proper" is very unclear and cryptic, no clear legal or medical parameters are prescribed that what proper means.

The legal system after experience and delivering various judgments could define it as minimum required skilful act, is at least required for a doctor, not to be labeled him negligent, They call it Bolam's principle of law, which is based on judgment in some case out of this country.

It is a surprise to know that no one in the legal or medical system is clear or aware of what is "minimum standard" of skill which must be there, and to more surprise all cases are decided and awarded based upon these parameters of skill of minimal standard, but nobody knows what that minimal standard is.[2]

To solve this technical issue the legal system seeks opinion of specialists in medical field, means opinion of other doctor/ doctors, is desired, which is a very strange situation.

No doctor is clear in his mind, nor having any clearly prescribed minimal standard of treatment anywhere in any literature of medical field anywhere in this world, but still gives his opinion, naturally just based on his knowledge, experience and personal biases only. This leads to variable opinions and recommendations which may be very different, even contradictory to one another when given by different specialists in similar cases.

Is that a real justice, certainly not this sort of opinions based on unclear principles and unprescribed minimal standards of care will either harm doctor or his so called consumer patient, besides great uncertainty in the final judgement.

This leads to lots of worries and mental tensions to both the parties expecting fare judgement.

If we see the final judgement in cases, the judiciary has already accepted that judicial officers are medical illiterate persons, they are solely depend on either of their personal perception of general knowledge, legal points involved or the opinion given by specialists in the field (doctors.)

This is already discussed above that in want of prescribed minimal standards of treatment the viewpoint on single or many specialists cannot be similar or cannot be considered as fare.

OVERVIEW OF CONSEQUENCES

The medical negligence cases can be classified into three types[2]

1. Criminal liability
2. Monetary liability
3. Disciplinary action.

Criminal liabilities are pursuant to the provision of the Indian Penal Code (IPC), but there is no separate provision in it for medical negligence.

Civil Liability is been fixed and comes under general law as a monetary compensation. The aggrieved party may take legal recourse in "Lok adalat" also under provision of Legal Service Authority Act of 1987, wherein first a trial of appeasement is done.

Permanent Lok Adalat has conferred powers similar to civil court and has jurisdiction in the cases up to Rs 1 crore.[2]

Disciplinary action in cases of medical negligence is governed by the Indian Medical Council (Medical Council of India [MCI] now National Medical Commission [NMC]), under professional conduct, Etiquette and Ethics regulations 2002. Appropriate medical council of states are also authorised to take disciplinary actions, where the name of medical practitioner can be removed temporarily or permanently.

DUTIES OF A DOCTOR AND MEDICAL NEGLIGENCE

A doctor or medical practitioner owns duty of care towards his patients, he is free to decide whether he should take the case in his hand or not (except in emergency life-threatening situations, where he is duty bound to save the life of patient performing whatsoever best is possible in those circumstances).

He is at liberty to decide the form of treatment on scientific principles as per his qualification, duty to careful administration of the decided treatment, not to proceed for any plan of action beyond his control.

It is also anticipated that the medical professional will show a considerable degree of skill and knowledge with a reasonable degree of care.[3]

Any breach of his duties, resulting in harm or damage is considered as negligence.

Before awarding compensation or penalty three basic points has to be proved beyond doubt.

1. There is a relationship of consumer and service provider between doctor and his patient with payment (or promise of payment) of money for that services, (called as consideration in legal terms)
2. The doctor (service provider) was duty bound to a particular duty which has not done either by commission or by omissions, and comes under the legal definition of negligence
3. The act of negligence by a doctor (service provider) has done any injury or damage to the patient.

All three points are must to prove beyond doubt for receiving any compensation or penalty in any case of medical negligence by any doctor.

Deciding criminal liability has no sufficient grounds.

The Supreme Court in case of Dr. Suresh Gupta versus Govt. Of NCT Delhi set the standard for bolting criminal liability and added that medical negligence of "gross" or "reckless" in nature will attract criminal liability not merely insufficiency of obligatory care, attention or skill.[4] In such cases section 304 IPC cannot be invoked, later the word "gross" was placed before bench of higher strength in the Supreme Court for reconsideration.[2]

In Jacob Methew versus the State of Punjab case.

Reconsideration by a bench of three judges countersigned that immensity of negligence should be the prerequisite for bolting criminal liability.

The civil and criminal liabilities are not exclusive for the same act of negligence, both actions may be obtainable.

"Neither the very highest nor a very low standard of care and competence can be taken in consideration of the particular circumstances of each case, is what the law requires."[3]

For standard of care by doctors, Bolam's test is applied which means standard of a normal proficient man exercising and processing to have that distinctive skill" and not of "the highest expert skill."[5]

This is relevant to both diagnosis and treatment.

Errors of judgement do not show a direct consequence of negligence.[6]

Gross mistakes would, however, summons the findings of negligence, for example, wrong drug, delegation of duties to a subordinate with less knowledge incapable of performing duties efficiently, removal of wrong limb, performing operation on wrong patient, ignoring warning of drug allergy and leaving swabs or other items inside the patient.[7]

Person not certified in particular or a certain branch of medicine, but commencing upon a treatment course in that field has been hold to be negligent.[2]

In case of a medical negligence first, the patient has the initial obligation to pursue a case of negligence later the doctor or the hospital is to convince that there is no lack of care or diligence.[8]

Only hospital can be made party in such case leaving doctor or staff aside, it is also immaterial that practitioner or staff are permanent or come on visiting bases.[9]

High care standard is judged by prevailing circumstances and available means, instruments etc. It is anticipated that generally required means or instruments should be made available and should be used as and when required.

But all this is presumption and usually an afterthought of judging specialists about what minimum was required or to be used.

Nowhere it medical literature it is taught or prescribed what are the minimum requirements of means and instrument for general care of any patient, there are so many diseases, many different circumstances and different requirements for medication, materials or instruments. List may be exhaustive or may not be possible to keep in all by any general practitioner, there is no prescribed or suggested list of required materials by any regulating medical authorities. This leads to great difficulty in deciding what minimum standard is there for a given circumstances. All this depends upon personal decision of the practitioner or personal bias of the specialists asked to give their opinion in a case of medical negligence.

For example, if a patient has developed very low oxygen saturation, level in his body, due to unknown reasons in some remote area and was required to be shifted to a bigger hospital for mechanical ventilatory support meanwhile during shifting the patient becomes comatose and passed away, in this case, previous hospital was fastened civil liability by state commission for medical negligence.

Working mechanical ventilator was declared necessary in a hospital before operation, but ventilator is generally operated by a separate anaesthesia specialist, a patient may develop any such complications or requirements, at any time after surgery, but an anaesthetic doctor practically may not be present round the clock in all operating hospitals in the country, so practically no operation will be possible in absence of a qualified, trained anaesthetic doctor, equipped with working mechanical ventilator in all operating hospitals in remote Ares especially, or operation will than only be possible in a very few limited hospitals only with enormously exhaustive number and list of patient, practically disastrous to the patients requiring emergency surgeries.

Both parties have the opportunity to seek specialist's opinion, but courts take its own judgement after getting opinion of such specialists, though they are not expert in the fields of medical sciences.[10]

INFORMED CONSENT

Informed consent is necessary for any treatment by a doctor, which explains the ailment, diagnosis, procedures for diagnosis, options of treatment and it's complications and consequences, all these must be understood by a patient through his doctor in his understandable manner and language, all this must be in written form in presence of witnesses within the legal provisions of a valid written informed consent. Thereafter final decision for treatment or procedure is decided by the patient or his guardian, as per legal provisions.

There must not be blanket consent (same general printed consent format for many types of different procedures/treatment). For each procedure clear written informed consent should be there and procedure must not go beyond that consent, if any extension or added procedure is required in any or emergency situation, a separate informed consent must be taken, explaining the than circumstances and requirements.

It is said that "adequate information" is to be furnished to a patient so that he is able to build a fair judgement, remote possibilities may not be disclosed.

Lack of informed consent or any procedure/treatment without it is a case of medical negligence.

ROLE OF JUDICIAL SYSTEM

A carefully balanced approach by legal system in medical negligence cases is desired.

It should have a balance between decision and autonomy of a doctor to drive a decision without fear with free mind and also the rights of a patient.

A few pronouncements of the Supreme Court in this matters are the commission should have to understand that every doctor has different perspective, for instance, some have more medical while some have more conservative approaches. This court has no sympathy for doctors who are negligent, it must also be said that after placing the medical profession under CPA the frivolous (fictitious) complaints against doctors have increased by leaps and bounds particularly after the medical profession was placed within the preview of the CPA.

As the courts and consumer forum are not experts in the medical sciences they must not substitute their own views over that of specialists, this way the medical specialists who are asked to give their opinion in any case of medical negligence must be very careful as the decision of court is very much depends on their expert opinion they must also be clear of legal provisions and about the fact that their opinion must consider and mention any circumstances for doctor's decision of a specific treatment, in light of those circumstances, and the doctor has used minimum standard of care and skills, as per his training and qualifications, does not require to apply the highest degree of skills and care.

WHAT DOCORS ARE REQUIRED TO DO

Various steps the doctors/hospital/nursing homes should take include.

a. Current practices, infrastructure, paramedical and other staff, hygiene, and sterility should be observed strictly

In the case of Sarwat Ali versus Professor R. Gogi (OP no. 181of 1997 decided on July 18, 2007 (NCJ) 52 cataract operations were performed between September 26, 1995 to September 28, 1995, in an eye hospital.

Fourteen patients lost their vision in the operated eye. Enquiry showed that in operation theatre two autoclaves were not working properly, which is used to sterilize instruments, cotton, pads and linen etc. and damage occurred due to its absence in working condition.

The doctor was held liable.

b. No prescription should be given over the telephone call without examination of the patient, except in acute emergency condition

(Now with permission to telemedicine by regulating body the NMC doctor can do this, within conditions and methods as described by it).

c. Doctors should not believe solely on patient's version about his symptoms, but analyse the case and investigate when necessary
d. A doctor should not experiment with his patient, even after his written consent, unless necessary
e. In doubtful cases, a proficient must be consulted, In case of Indrani Bhattacharjee (OP No. 233 of 1996 decided on Aug 9th, 2007 –(NC), the patient was diagnosed as a case of mild lateral wall ischemia, as the doctor prescribed medicine for gastroenteritis, The patient expired, the doctor was held liable, saying that he must have advised to take counsel from a cardiologist, in writing
f. Full records of diagnosis and treatment etc. Should be maintained.

These are broad guidelines only and not all.

Supreme Court laid down few binding guidelines, before filing criminal cases against doctors to protect them of frivolous and unjust prosecution, till statuary rules or instructions by the government in consultation with MCI, are issued, these are.[11]

1. Private complaints may not be entertained unless complainant has produced prima facie evidence in the court in the form of credible opinion given by another doctor
2. Investigating officer should obtained an independent and competent medical opinion preferably from a doctor in government service qualified in that branch of medical practice who can normally be expected to give an impartial and unbiased opinion applying Bolam test to the facts collected in the investigation
3. Doctor may not be arrested in a routine manner unless the arrest is necessary for furthering the investigation or for collecting the evidence or if the investigation officer is satisfied that doctor may flee.

This requirement was subsequently sought to be made a necessity by the Supreme Court for initiating the action seeking

imposition of civil penalties but was done away with thereafter for civil actions.[12]

CONCLUSION

Medical science is a science of probability and art of uncertainty, no one in medical science can declare what would be the definite results of treatment given to a patient, even after the best possible efforts.

Lord Denning the eminent jurist of the UK said that one cannot compare medical science with any factory or traffic conditions, if every rule is followed in any factory or by traffic on roads, there will be no accidents, but in medical science even if every rules are followed there is no guarantee that accidents or failure will not occur.

Many different variables, factors, bodily conditions and natural reasons effect the ultimate result of any given treatment by any doctor in this world, therefore mear any failure of treatment in a patient or death can not be called as negligence.

It is said that errors of judgment is not a negligence, all legal professionals including judiciary is considered causing no negligence and given universal immunity for any legal action against them (beside other immunities given to judicial officers), advocates because of this perception were given immunity for any legal action in consumer cases and removed of consumer laws, at later dates.

It is considered that judicial system is "fountain of law" to all citizen and it is given immunity for any mistake, considering that it does everything in good faith to provide justice to a person, and also to work without fear and with free mind.

Why the same principles are not applied for medical science and doctors, almost all doctor perform their duties towards patients for their benefit with their full dedication, on the basis of available knowledge and skills to them, why they are not considered as fountains of health, in a similar manner, why they are not given legal immunity of any punitive action just like advocates or judicial system, so that they can also perform their duties with free mind, without tensions and fear of any punitive actions alike advocates, also all decisions and treatment by a doctor is the result after an opinion of him, based on his knowledge, skill and decision after vigorous training schedule, one of the most difficult course in this world.

A serious thinking is required in this direction by competent persons to reform the consumer laws or to remove doctors and medical professionals out of scope of consumer laws, in public interest at large.

Negligence is never intentional it is because of the absence of mind not a willful act, no service giver or any person giving any advise is free from chances of being negligent than why only doctors or medical professionals are victim of consumer laws, alike other professions, this is neither justice to doctors nor beneficial for peoples in the country.

For example, now doctor by his clinical knowledge, skills and experience knows what the diagnosis of a patient and what treatment is appropriate, but because of fear of legal actions against him he is compelled to do all sorts of costly or very costly investigations, just to justify his diagnosis, keeping proof or exclusion of other possible, similar diseases.

This has not only increased the cost of treatment but time-consuming and now kills the clinical assessment skill of a doctor.

This is also very surprising that an enormous amount of money is awarded to a complainant in consumer cases based on accident claim laws for compensation, it creates a great stress and fear in minds of a doctor, just to avoid any legal actions, now doctors at remote places are now highly fearful to take serious, life-threatening emergency cases, though they are having better chances of survival and recovery if continuous immediate medical care is provided to them, because of fear of legal provisions and monetary penalties now doctor gives initial treatment for short time to temporarily stabilize the condition of patient are rapidly refer him to bigger equipped centres, this not only makes the treatment very costly but there are very high chances of death of a serious patient in the way, due to long treatment is required to stabilize his condition and ill effects or transportation conditions in such serious condition of the patient.

This is also not clear why there are cases and penalties in medical cases only, for example, taxi or train passenger services are also consumer services, but which service provider in such services provide all information's such as road conditions, Ill effects of journey, chances of accidents, technical details of engine or its parts (as expected in surgical operations), results of failure or breakdown of machines or its parts and why not written informed consent is necessary in such other services, why those service providers are not considered negligent in their services in absence of written informed consent as in case of a doctor.

A lot many discussions, consideration is required to re-think about removal of medical services by all concerned in the country, in benefit of law, general public, patients and doctor's interest.

A thorough reviews and their effects on treatment and benefits to the patients is desired by legal and law making bodies with open mind, instead of prejudices.

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ORIGINAL ARTICLE

Comparision of efficacy of dexamethasone with levobupivacaine, clonidine with levobupivacaine and levobupivacaine alone in ultrasound-guided transverse abdominis plane block for post-operative analgesia in lower abdominal surgeries: A randomized double blind controlled study

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Introduction: Ultrasound-guided PNB is a real-time imaging of the position of aimed, targeted, or leveled nerve, needle, and surrounding vasculature. Because of effective and applicable component of multimodal analgesia for postoperative pain, transverse abdominis plane (TAP) block have been used for variety of abdominal procedures. This study was done to establish the role of clonidine and dexamethasone as an adjuvant to levobupivacaine separately in TAP block in patient undergoing lower abdominal surgery. **Materials and Methods:** Present study was carried at tertiary care Hospital. After receiving ethical approval from college ethical committee, 90 patients aged 18–60 years old with ASA Grade I and II physical status who were undergoing elective lower abdominal procedures were included in the study. Each patient was randomly allocated to one of the three groups of 30 patients each. Group A: received TAP Block with 20 ml of 0.25% levobupivacaine + 8 mg dexamethasone (2 ml). Group B: Received TAP Block with 20 ml of 0.25% Levobupivacaine + 50μg clonidine (diluted with distilled water [2 ml]). Group C: Received TAP Block with 20 ml of 0.25% Levobupivacaine and normal saline as placebo (2 ml). All patients were asked to give scores for the pain. Pain severity is evaluated using visual analog scale. Hemodynamics was monitored and any side effects was noted. **Results:** There was no significant difference in age, weight, heart rate, SBP, DBP, MAP, oxygen saturation among the groups showing comparability of the groups in terms of age ($P > 0.05$). The comparison of visual analog scale scores at different time intervals in all three Groups showed that TAP block has better analgesic effects with Levobupivacaine + clonidine as compared to levobupivacaine + dexamethasone and levobupivacaine alone in a post-operative analgesia. **Conclusion:** We conclude that the addition of clonidine as an adjuvant to levobupivacaine in TAP block for lower abdominal surgeries during anesthesia resulted into improved quality and increased duration of post-operative analgesia and decreased analgesic requirements with no side effects.

KEY WORDS: Clonidine, Dexamethasone, Transverse abdominis plane block, Ultrasound

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INTRODUCTION

Uncontrolled pain leads to profound surgical stress and stimulation. The effective pain control post-operative is a significant component of the attention of patient undergone surgery. Transverse abdominis plane (TAP) block has been given with local anesthetic (LA) such as Bupivacaine and

Ropivacaine with limited duration of action. Additives to LA such as opioids, ketamine, and alpha2 agents such as clonidine and dexmedetomidine, corticosteroids such as Dexamethasone have been successfully used in peripheral neural block to increase the duration of postoperative analgesia.[1] Ultrasound-guided PNB is a real-time-imaging of the position of the aimed or targeted or leveled nerve, the needle and the surrounding vasculature, this improves, the ease of performing the procedure and increases the ease of success rate. The TAP described firstly by Rafi in 2001.[2]

This study was done to establish the role of the clonidine and the dexamethasone as an adjuvant to levobupivacaine separately in TAP block in patient undergoing lower abdominal Surgery, to compare the duration of the Analgesia, time of first onset of pain and time of first required for analgesia, Compare post-operative rescue Analgesic requirement in first 24 h, Compare the hemodynamic and respiratory stability and any side effects or complications of study drugs and blocks.

MATERIALS AND METHODS

The present study was carried at tertiary care Hospital. After receiving ethical approval (IEC/01/2019/SEPT) from the college ethical committee and CTRI registration (CTRI/2020/01/022652), 90 patients aged 18–60 years old with ASA grade I and II physical status who were undergoing elective lower abdominal procedures were included in the study. Each patient was randomly allocated to one of the three groups of 30 patients each. Group A: Received TAP Block with 20 ml of 0.25% levobupivacaine + 8 mg dexamethasone (2 ml). Group B: Received TAP Block with 20 ml of 0.25% Levobupivacaine + 50µg clonidine (diluted with distilled water [2 ml]). Group C: Received TAP Block with 20ml of 0.25% Levobupivacaine and normal saline as placebo (2 ml).

Evaluation of patient was to be carried out through proper history taking, clinical examination, and routine laboratory investigations. All patients were informed regarding procedure (USG guided TAP Block) and were trained to use the visual analog scale (VAS). Patients were kept Nil per oral for 6 h before surgery. All patients were premeditated. The multi-channel monitor was connected to the patient to display continuous ECG monitoring for heart rate (HR), noninvasive arterial blood pressure,and peripheral oxygen saturation. Baseline monitoring data was taken.

General anesthesia (anesthesia induction) was carried out according to standard anesthesia protocol. Then ultrasound-guided TAP block was performed after the surgery finished. All patients will be positioned in the supine position. After skin disinfection the abdominal wall was scanned using the linear array transducer probe (6–13 MHz) in multibeam mode, connected to a transportable ultrasonography unit. The edge of the probe was covered by a plastic transducer sheath which is sterile and a gel that is sterile was applied over the skin. A 60–80 mm, 22G short bevel needle was than advanced from an anterolateral to a medial direction using the in-plane insertion with ultrasound real-time assessment.

The progression of the needle was visible as a bright hyperechoic line. Locate the tip correctly in the plane that is targeted and then with help of the intermittent aspiration inject the drugs, also confirm the correct placement and position of the needle by the expansion of the LAs solution which is visible as shadow dark-colored between aponeurosis of internal oblique and the transverse abdominis muscles.

The existence and severity of pain, nausea, and vomiting and any other side effect were assessed in each patients and in all three groups. These assessments were achieved in "PACU (Post Anesthetics Care Unit)" at 30 min and 2, 4, 6, 12, 24 h postoperatively. All patients were asked to give scores for the pain. Pain severity is evaluated by using visual analog scale [Figure 1].

RESULTS

The mean age of patients of Group A, Group B, and Group C was (36.20 ± 9.18), (36.30 ± 9.02) and (35.50 ± 8.78) years, respectively. There was no significant difference in age among the groups showing comparability of the groups in terms of age ($P > 0.05$). The mean weight of patients of Group A, Group B, and Group C was (60.07 ± 8.41), (60.07 ± 8.10) and (59.07 ± 7.11) years respectively. There was no significant difference in weight among the groups showing comparability of the groups in terms of weight ($P > 0.05$). Base line HR was higher as compared to different time period till 12 h. Mean ± SD value of Group A versus Group B versus Group C at base line and at different time period from 30 min to 24 h were (84.9 ± 10.74) versus (84.24 ± 11.18) versus (85.86 ± 7.82); (74.13 ± 12.07) versus (75.87 ± 9.77) versus (76.73 ± 8.96); (74.8 ± 11.21) versus (76.27 ± 9.99) versus (77.8 ± 8.93); (75.73 ± 11.12) versus (76.4 ± 10.16) versus (78.27 ± 8.63); (76.27 ± 10.88) versus (76.87 ± 10.29) versus (79.57 ± 9.29); (78.33 ± 10.97) versus (77.53 ± 10.02) versus (80.57 ± 8.9); (84.7 ± 10.26) versus (83.07 ± 11.06) versus (85.4 ± 7.66) respectively. There was no significant difference in HR among the groups at all the time periods ($P > 0.05$). HR came to base line level after 24 h of TAP block. Base line HR was higher as compared to different time period till 12 h. Mean ± SD value of Group A versus Group B at base line and at different

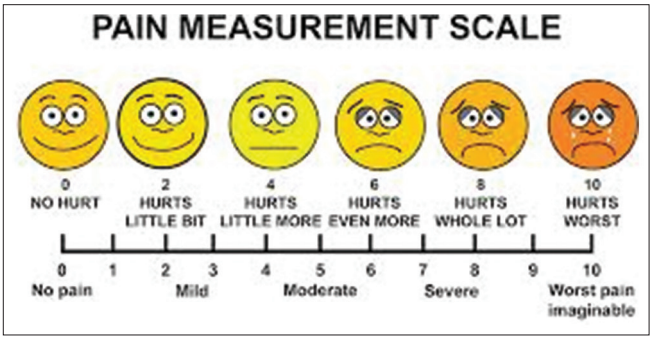

Figure 1: Visual analogue scale. 1–2 = No pain, 3–4 = Mild pain, 5–6 = Moderate pain, 7–8 = Severe pain, 9–10 = Intolerable pain

time period from 30 min to 24 h were (84.9 ± 10.74) versus (84.24 ± 11.18) versus (84.24 ± 11.18); (74.13 ± 12.07) versus (75.87 ± 9.77); (74.8 ± 11.21) versus (76.27 ± 9.99); (75.73 ± 11.12) versus (76.4 ± 10.16); (76.27 ± 10.88) versus (76.87 ± 10.29); (78.33 ± 10.97) versus (77.53 ± 10.02); (84.7 ± 10.26) versus (83.07 ± 11.06) respectively. There was no significant difference in HR between the groups at all the time periods ($P > 0.05$). HR came to base line level after 24 h of TAP block. Base line HR was higher as compared to different time period till 12 h. Mean ± SD value of Group A versus Group C at base line and at different time period from 30 min to 24 h were (84.9 ± 10.74) versus (84.24 ± 11.18) versus (85.86 ± 7.82): ($P > 0.05$); (74.13 ± 12.07) versus (76.73 ± 8.96): ($P < 0.05$); (74.8 ± 11.21) versus (77.8 ± 8.93): ($P < 0.05$); (75.73 ± 11.12) versus (78.27 ± 8.63): ($P < 0.05$); (76.27 ± 10.88) versus (79.57 ± 9.29): ($P < 0.05$); (78.33 ± 10.97) versus (80.57 ± 8.9): ($P < 0.05$); (84.7 ± 10.26) versus (85.4 ± 7.66): ($P > 0.05$) respectively. There was no significant ($P > 0.05$) difference in HR between the groups at base line and at 24 h while there was significant difference from 30 min to 12 h of time periods ($P > 0.05$). HR came to base line level after 24 h of TAP block. Base line MAP was higher as compared to different time period till 12 h. Mean ± SD value of Group A versus Group C at base line and at different time period from 30 min to 24 h were (93.46 ± 6.52) versus (92.96 ± 7.26): ($P > 0.05$); (83.29 ± 5.81) versus (80.29 ± 4.62): ($P < 0.05$); (83.29 ± 5.81) versus (80.42 ± 4.34): ($P < 0.05$); (83.87 ± 5.57) versus (82.22 ± 5.25): ($P < 0.05$); (85.13 ± 6.72) versus (87.03 ± 6.07): ($P < 0.05$); (89.98 ± 5.94) versus (91.44 ± 7.85): ($P < 0.05$); (94.22 ± 6.74) versus (92.82 ± 7.54): ($P > 0.05$), respectively. There was no significant ($P > 0.05$) difference in MAP between the Group A and Group C at base line and at 24 h while there was significant ($P < 0.05$) difference at 30 min, at 2 h, at 4 h, at 6 h, and at 12 h of time periods. MAP came to base line level after 24 h of TAP block. Base line VAS scores was higher as compared to different time period. Mean ± SD value of the Group A versus Group B versus Group C at base line and at different time period from 30 min to 24 h were (5.36 ± 0.76) versus (5.84 ± 0.72) versus (5.88 ± 0.68): $P > 0.05$; (0 ± 0) versus (0 ± 0) versus (0.03 ± 0.18); (0 ± 0) versus (0 ± 0) versus (0.13 ± 0.51); (0 ± 0) versus (0.13 ± 0.43) versus (0.57 ± 1.07); (0.63 ± 1.45) versus (0.17 ± 0.46) versus (3.67 ± 0.76): $P < 0.05$; (3.97 ± 1.03) versus (0.27 ± 0.64) versus (4.6 ± 0.5): $P < 0.05$; (4.63 ± 0.89) versus (5.63 ± 0.76) versus (5.7 ± 0.7): $P < 0.05$. There was no significant ($P > 0.05$) difference in VAS scores among the groups at the base line while there is significant ($P < 0.05$) difference at 6 h, at 12 h and at 24 h [Table 1 and Figure 2].

The comparison of VAS scores at different time intervals in all three Groups showed that TAP block has better analgesic effects with Levobupivacaine + clonidine as compared to Levobupivacaine + Dexamethasone and Levobupivacaine alone in post-operative analgesia.

DISCUSSION

Controlling pain effectively not only facilitates recovery from surgery but also accelerates rehabilitation from surgery. In TAP block LA agent is used, which is the simple and effective analgesic technique, adequate enough for any surgical procedures to provide a relief from a significant and important component of a parietal post-operative pain. The excellent analgesia (pain relief) to the skin and the musculature of the anterior wall of abdominal is provided by the use of LA agents in TAP block, in patient undergoing colonic resection surgery in whom midline abdominal wall incision is done, also in patient undergoing cesarean delivery [Tables 2 and 3; Figures 3 and 4].

The procedure known as transversus abdominis plane (TAP) block is commonly used as a new safe regional anesthetic technique alternative to neuroaxial blockade for abdominal surgeries without the use of opioids (El Fawy and El Gendy).[3] Better operative conditions and a short duration or interval of post-operative analgesia are provided by the use of LA agent throughout the regional blocks. Therefore, lots of clinical trials used adjuvant to prolong the duration and increase the action of LAs for post-operative analgesia.[4]

Clonidine acts centrally as an alpha2 agonist and has attracted interest as an adjunct to anesthesia. Previous studies have suggested that clonidine reduces or minimizes the need for volatile anesthetics when approached by hemodynamic responses (Thomson *et al*.).[5] Fehr *et al*.[6] found that intravenous clonidine allows a lower propofol dose to be used when a same type of anesthesia is provided in spite of any intraoperative awareness or prolonged recovery times.

Owen D J *et al*.[7] compared the efficacy of dexamethasone as an adjunct used in TAP block along with bupivacaine. It is concluded that with addition of dexamethasone as an adjuvant in TAP block prolongs the duration of analgesia as compared to addition of saline (placebo). Increase in the time interval of the block effect is because of the anti-inflammatory effect of dexamethasone. Another school of thought suggests that there is the direct effect of the drugs on the nerve membrane in place of its effect as an anti-inflammatory action were able as dexamethasone, which is a corticosteroid drug, were to inhibit ectopic neural discharge originating in the neuromas (Devor *et al*.).[8]

The action of various LAs is potentiated by steroid via the intonation or we can say inflection of the function of the potassium channels in the excitable cells. Further, pain signal modulation within the spinal cord is a suggested mechanism because as betamethasone used intrathecally produces quick and fast analgesia for pelvic and perineal cancer pain that existed for 5 days.[9]

Our study revealed that there was no statistically significant difference ($P > 0.05$) in HR among three groups at all the time periods. Baseline HR was higher as compared to different time period till 12 h and at 24 h HR becomes equivalent to baseline, this occurs because patient's pain was relieved due to TAP block effect but as time passes the effect of TAP block starts decreasing after certain time periods.

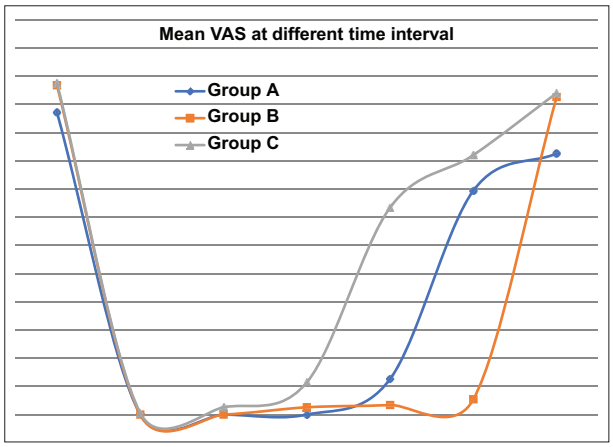

Figure 2: Comparison of visual analogue scale among the groups across the time periods

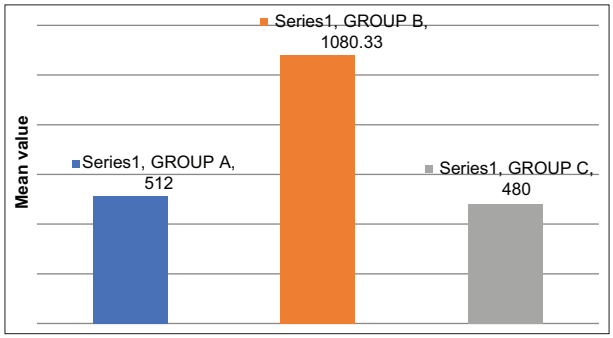

Figure 3: Comparison of time of first request of analgesia among the groups

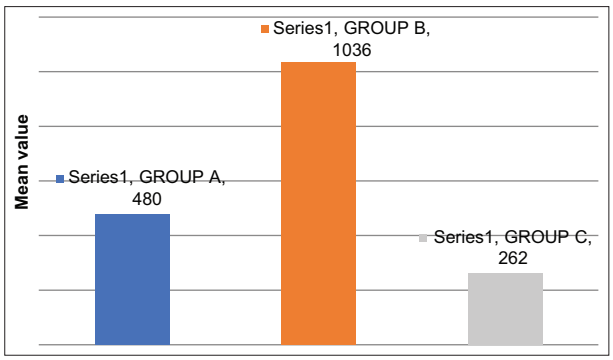

Figure 4: Comparison of duration of analgesia among the groups

However, there is still some variations in the SBP, DBP, and MAP readings among all the three groups at all the time periods. This is because the Group A patient had pain relief after TAP block for around 4–8 h but still there is hemodynamic stability because drug Dexamethasone is hemodynamic stable than drug clonidine.

In our study, there was a significant ($P < 0.001$) difference in VAS score among the groups at 6 h, 12 h and 24 h. VAS score was lower at time interval 6 h and 12 h in Group B (0.17 ± 0.46) and (0.27 ± 0.64) compared Group A (0.63 ± 1.45) and (3.97 ± 1.03) and Group C (3.67 ± 0.76) and (4.6 ± 0.5), respectively. VAS score was lower in Group A (4.63±0.89)

Table 1: Comparison of VAS among the groups across the time periods

Time interval	VAS			*P*-value
	Group A	Group B	Group C	
	Mean±SD	Mean±SD	Mean±SD	
Baseline	5.36±0.76	5.84±0.72	5.88±0.68	> 0.05#
30 min	0±0	0±0	0.03±0.18	-
2 h	0±0	0±0	0.13±0.51	-
4 h	0±0	0.13±0.43	0.57±1.07	-
6 h	0.63±1.45	0.17±0.46	3.67±0.76	< 0.001*
12 h	3.97±1.03	0.27±0.64	4.6±0.5	< 0.001*
24 h	4.63±0.89	5.63±0.76	5.7±0.7	< 0.001*

Table 2: Comparison of time of first request of Analgesia among the groups

Group (*n*=30)	Time of first request of Analgesia	*P*-value
	Mean±SD	
Group A	512.0±88.67	< 0.001* Statiscally significant
Group B	1080.33±117.49	
Group C	480.0±172.61	

Table 3: Comparison of duration of analgesia among the groups

Group (*n*=30)	Duration of Analgesia	*P*-value
	Mean±SD	
Group A	480.0±94.54	< 0.001* Statiscally significant
Group B	1036.0±119.93	
Group C	262.0±43.1	

than Group B (5.63 ± 0.76) and Group C (5.7 ± 0.7) at 24 h. In accordance to our study, Ammar and Mahmoud[7] studied 60 adult patients undergoing elective open abdominal hysterectomy were randomly allocated to receive TAP block using 20 mL of bupivacaine hydrochloride 0.25% + 2 mL saline 0.9% (control group, $n = 30$) or 20 mL of bupivacaine hydrochloride 0.25% + 2 mL dexamethasone "8 mg" (dexamethasone group, $n = 30$). It is seen that the pain VAS scoring was remarkably lower at the postoperative 2 h (4.9 vs. 28.1, $P = 0.01$), 4 h (12.2 vs. 31.1, $P = 0.01$) and 12 h (15.7 vs. 25.4, $P = 0.02$). Thakur *et al*.[10] reported in their study that VAS score was remarkably higher in group B (bupivacaine) in comparison to BDM (bupivacaine + dexmetomidine) and BDX (bupivacaine + dexamethasone), and higher in BDX in comparison to group BDM. Mir *et al*.[11] showed that the overall mean VAS score in Group I (25 ml of injection bupivacaine 0.25%) was 3.03 ± 1.57 and Group II (was 1.72 ± 1.02 with $P = 0.0005$ and hence better quality of analgesia in Group II (25 ml of 0.25% of bupivacaine with 1 ug.kg^{-1} of clonidine).

Thomson IR *et al*.[12] found that the primary outcome which was the time to first requested analgesia was prolonged in the dexamethasone group (P = 0.000) compared to bupivacaine and dexamethasone group. It was found that, no remarkable difference concerning between two groups regarding rectal diclofenac total dose with a P = 0.068.

Many studies proved that ultrasound-guided TAP block performed using LAs and dexamethasone is added, which acting as an addition or an adjuvant to it, is seen and found to be safe and effective strategies for providing analgesia in postoperative period. It was explained that by binding of dexamethasone to receptors of glucocorticoid and also it inhibits potassium conductance, thus decreasing the transmission of stimulus in unmyelinated c-fibers which is carrying nociceptive information by inhibiting the specific activity of the, K+, potassium channels on these fibers. Addition to this, dexamethasone causes vasoconstriction to the various tissues, and slower uptake by the local anesthesia is also slower absorption, thus enhancing its duration and also relief sensed by the patients. Furthermore, dexamethasone shows an effective anti-inflammatory action which is potent enough and exhibit by suppressing the secretion and synthesis of various inflammatory-mediators (IL) interleukins and cytokines which increases the period and duration of the analgesia above to 48 h.[13-15]

The maximum benefit from TAP block is among some patients includes those who are having morbidly obesity or having an OSA problem as it offers opioid-sparing effect. It may be seen and found to be safer alternative to neuraxial block for intra and post-operative analgesia in patient having coagulopathy. The use of USG for TAP is increasing these days using landmark-based anatomical approaches because with the use of USG may increases the effectiveness of the TAP block.

CONCLUSION

Overall, addition of clonidine as an additive or an adjuvant to bupivacaine in TAP block for lower abdominal surgeries is more effective and provides effective post-operative analgesia resulted into improved quality and increased duration of postoperative analgesia and decreased analgesic requirements with no side effects.

Transverses-abdominis-plane blocks are a relatively new technique used in a multimodal approach to provide post-operative analgesia followed after abdominal surgery. It is considered a technically simple block to perform, with a high margin of safety. For multimodal postoperative analgesia, the TAP block proved to be effective and safe.

It also proved that the consumption of intravenous opioids has been reduced with use of this block, resulting in fewer opioid-mediated side effects.

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Original Article

Paracervical block versus intrauterine lignocaine for Pain relief during cervical dilatation an endometrial curettage

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Introduction: The abbreviation D&C refers to the dilatation of the cervix and removal of the undesirable uterine lining. However, surgical procedures such as scraping and scooping (curettage) of the uterus's undesirable contents. Although most patients can withstand pain in order to complete necessary treatments, research reveals that scores of the pain are frequently high in the majority of situations. According to a review of the literature, the potential of intrauterine lignocaine can give pain relief more effectively than the usual paracervical block. **Materials and Methods:** Sixty individuals who came to the OPD for treatment were examined and recruited in the study. Using computer-generated random numbers, patients were divided into two groups. A parameter named visual analog scale was used by all patients to assess the degree of their pain. **Results:** In both groups, the arithmetic mean of score of the pain recorded was not statistically different between vaginal multiparous and nulliparous women. Excessive pain was defined as a pain score of higher than 6 on a scale of 10 points. When compared to the lignocaine group (16.70%), group B (33.30%) has a considerably higher number of females experiencing less pain during endometrial curettage (P = 0.001). The heart rate increment was also considerably higher in group A, indicating a more strong sympathetic reaction to the higher level of pain reported by group A. All of the patients were able to finish the surgery satisfactorily.

KEY WORDS: Intrauterine lignocaine, paracervical block, pain during during dilatation and curettage

INTRODUCTION

The abbreviation D&C stands for dilation of the cervix and removal of the uterus's undesirable lining. And surgical procedures such as scraping and scooping (curettage) of the uterus's undesirable contents. For abnormal uterine bleeding, it serves as both a diagnostic and therapeutic tool. These women were also told they needed a first-trimester abortion, which is a procedure that is rarely undertaken. This technique can be done under conscious sedation, general anesthesia (GA), or local anesthetic because it deals with pain and discomfort. Only a few practitioners employ GA because it is associated with anesthetic problems, the requirement for a hospital stay, and a significant expense.[1,2]

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Most individuals are able to withstand pain while undergoing required operations. However, it was discovered that in the majority of cases, the pain score increased dramatically. Cervical curettage and cervical biopsy are linked to visual analog scale (VAS), with range of pain scores of 4–6 on a scale having 10-point. And endometrial biopsies received a VAS score ranging from five to seven. For the installation of the intrauterine device (IUD), the pain scale ranges between 2 and 7. For insertions of laminaria with paracervical block, pain scores range from 5 to 7. Recent reviews of the literature on pain control during hysteroscopy, IUD insertion, hysterosalpingography, and first-trimester abortion have been published and the best approaches of control pain are unknown.[3]

According to a review of the literature, lignocaine given intrauterine has the ability to give pain relief more effectively than the usual paracervical block. Our research aims to look at this pain relief method in a developing country where, due to a lack of resources, completing these procedures in an outpatient setting is a must.

MATERIALS AND METHODS

The Obstetrics and Gynecology Department at RMCH Bareilly conducted a comparative prospective and randomized study. After their signed informed consent was obtained, sixty patients in the OPD were examined and included in the study.

Exclusion Criteria

I. Not willing to give consent
II. Patients having medical disorders
III. Cerebrovascular disorders
IV. Previous surgery associated with cervix
V. Previous pelvic radiotherapy
VI. Active pelvic inflammatory disease
VII. Endometrial polyps
VIII. Submucous fibroids
IX. Uterine size >10 weeks and
X. History of allergic reaction to lignocaine.

Inclusion Criteria

I. Patients having requirements of D&C.

Patients were recruited into two different groups. It was randomized by providing computer-generated random numbers to all the recruited patients. To reduce individual bias all the pain assessment and procedures were accomplished by providing a single operator. For every patient, a standard protocol was followed for D&C. Before the procedure those patients were of 10 ml of one percent lignocaine with a 23 Gauge disposable syringe at the position of 3 o'clock and 9 o'clock of the cervicovaginal junction. Instillation of 5 ml of two percent lignocaine in the uterus using Foley's catheter was done to group B. To prevent backflow, the catheter was left in place for two minutes before being removed, giving the anesthesia enough time to act. After that, uterine sounding, cervical dilatation if necessary, and uterine curettage were carried out as usual.

A VAS was used by all patients to assess the degree of their pain (VAS). The subjects were also asked to rate their discomfort on a ten centimeter VAS, with 10 points denoting the most agonizing and terrible pain and 0 denoting no pain. The pulse rate was immediately measured after the surgery. The degree of the patient's pain was the main outcome measure in this research.

RESULTS

The patients in group A and B were compared by taking into account their BMI, age, parity, and intervention indications, shown in Table 1.

SPSS 21 was used to analyze the data, and each variable was checked for normality before the groups were compared. The data were analyzed with the student Chi-square and t-test, where needed.

Table 1: Demographic profile and procedure indications

Variables	Group A (Paracervical block) (*n*=30)	Group B (Intrauterine lignocaine) (*n*=30)	*P*-value
Mean age (years)	44.81±6.46	41.07±8.01	0.021
Mean BMI	24.3±3.8	25±5.5	0.78
Parity			
0–1	1	5	0.22
2–3	23	20	
4 or more	6	5	
Previous vaginal birth			
0	5	4	0.71
1 or more	25	26	
Menopausal status			
Premenopausal	27	28	0.64
Postmenopausal	3	2	
Indication			
Menorrhagia	7	8	0.39
Irregular bleed	10	15	
Polymenorrhea	5	3	
Postmenopausal bleed	5	2	
Simple hyperplasia	1	2	
Others (secondary amenorrhea and suspected genital Tuberculosis)	2	0	

Patients for cervical dilation were chosen based on their cervical status, which was determined at the time of surgery. No statistically significant variations in menopausal state, age, previous vaginal birth, parity, or BMI between groups A and B. The VAS was used to assess the patient's pain during the surgery. Tables 2 show that pain in the paracervical block group was considerably higher than pain in the intrauterine lignocaine group. The degree of pain experienced was unaffected by the patients' parity. By comparing the arithmetic mean of recorded score pain of vaginal nulliparous and multiparous women in both groups, with no significant statistical difference. Excessive pain was defined as a pain score of higher than 6 on a scale of 10 points. When compared to the lignocaine group (16.70%), the number of females in group B (33.30%) experiencing less discomfort during endometrial curettage is significantly higher (P = 0.001) [Table 3]. It was also discovered that group A had a much higher heart rate increase. This demonstrates a stronger sympathetic response to the higher level of pain in group A. All of the patients were able to complete the surgery satisfactorily.

DISCUSSION

This study evaluated different types of methods to perform uterine anesthesia. Uterine anesthesia has been attempted in different gynecologic procedures by some investigators and various data on its effectiveness, which have been reported. Trolice *et al*. were the first to evaluate the of IUT (intrauterine topical) anesthesia efficacy for endometrial biopsy in premenopausal and postmenopausal women, regardless of parity, and found good results. The intrauterine administration of lignocaine had shown a considerable reduction in pain scores, with median pain scores of 4.7 compared to 9.9 in the experiment.[5,6]

Rattanachaiyamont *et al*.[7] conducted a randomized, double-blind, 66 women participated in a placebo-controlled experiment. Who had Fractional Curettage (F/C) with help of Sims Curette and had abnormal uterine hemorrhage. A paracervical block was used on all of the patients, along with either saline or intrauterine lignocaine. Between groups A and B, there was a statistically significant difference in pain levels of pain score 2.3 versus 4.7. The arterial blood pressure and heart rate profiles were identical. The paracervical block (A) group showed a much larger increase in heart rate, which could imply a stronger sympathetic reaction to the higher level of discomfort they were experiencing. Because two percent lidocaine has a faster onset and shorter duration of action than bupivacaine, which had previously been used in trials, and because 2% lidocaine theoretically had better efficacy than 1 percent lidocaine,[8] it was chosen for intrauterine anesthesia. The time it requires for the local anesthetic to take effect is also crucial. Within 10 minutes of topical lidocaine administration, the anesthetic effect peaks.[9] This research is also in line with Cicinelli *et al*.[8] Before an office hysteroscopy and/or endometrial biopsy, 80 women were randomly randomized to receive 2 ml of 2% mepivacaine or normal saline with a 5-min delay. The women who received the mepivacaine infusion demonstrated a statistically significant reduction in discomfort. In their placebo group, they reported a much greater (32.5%) incidence of vasovagal response.

Hui *et al*.[10] discovered that intrauterine lignocaine reduced discomfort during suction curettage in the endometrial sample of pain score 2.1 versus 4.2 in a randomized, double-blind controlled experiment including 200 participants. This study, however, differed from ours in that it did not include postmenopausal women, employed a vacuum aspirator for endometrial collection, and did not include any additional pain management method, such as paracervical block and NSAID.

This could also explain why there was no variation in blood pressure and pulse between group A and B, according to these researchers. The importance of NSAIDs cannot be overstated, since their systemic action of suppressing prostaglandin synthesis works in tandem with a local anesthetic to give the patient with the right possible analgesia. In a double-blind, placebo-controlled randomized study of 120 individuals having endometrial biopsy utilizing the Pipelle device,[11] Dogan *et al*. confirmed this. When compared to placebo groups, the arithmetic mean of pain scores in NSAID and lignocaine groups were no noticeable differences. The recorded score of pain in the lignocaine with NSAID group, on the other hand, was comparatively lower (4.6 vs. 7.1). The adequacy of the histology sample was one of the study's significant secondary outcomes. This reflects the patient's level of comfort throughout the process, which translates to improved cooperation.

The pain score in the lignocaine with NSAID group was much lower (4.6 vs. 7.1). One of the important secondary outcomes of our study was the adequacy of the histopathology sample, which reflects the patient's level of comfort throughout the process,

Table 2: Clinical assessment in both groups

Variables	Paracervical block (Group A)	Intrauterine lignocaine (Group B)	*P*-value
Mean arterial blood pressure	110±9.82	106±7.82	0.217
Heart rate	81.54±12.32	74.69±5.71	0.017

Table 3: Pain score between two groups

Variables	Paracervical block (Group A) (n=30) Percentage	Intrauterine lignocaine (Group B) (n=30) Percentage	*P*-value
Not satisfactorily poor	5 (16.70)	1 (3.30)	0.098
	10 (33.30)	3 (10)	
Good	10 (33.33)	16 (53.30)	
Excellent	5 (16.70)	10 (33.30)	

which translates to improved cooperation. In the intrauterine lignocaine group, only four patients had an insufficient sample, compared to seven in the paracervical block group. Although this outcome was not considerable, it could be a reflection of the lignocaine group's reduced pain perception.

There were four patients in the intrauterine lignocaine group had an inadequate sample if compared to the paracervical block group it was found only seven. And this result was not considerable, it could have additional reflection of less perception of pain in the lignocaine group. The results of this study and also a review of the literature on this title shown intrauterine lignocaine for endometrial biopsy and curettage is safe and effective.

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Original Article

To study the effect of cigarette smoking on anthropometric markers, serum alpha 1 antitrypsin and cotinine levels

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Introduction: In the United States (US) and other countries cigarette smoking (CS) continues to be the more preventable cause of disease and death. To both tobacco use and exposure to environmental tobacco smoke (ETS), cotinine is widely applied as a marker, because it has a longer half-life (average, 18–20 h) than nicotine (average, 2–3 h). Alpha1-proteinase inhibitor or SERPINA1 are other used words for alpha 1 antitrypsin (A1AT), and also the SERPIN (an acronym for serine proteinase inhibitor) family of protease inhibitors, prototypical member. Age, height, weight, body mass index (BMI), waist circumference, and waist-hip ratio are simple and valid anthropometric measures for the assessment of risk of obesity and other systemic diseases in smokers The objectives of the present study were to measure the levels of serum A1AT, cotinine in cigarette smokers and to study the association between these biochemical markers with anthropometric markers and the duration and number of cigarette smoked. **Materials and Methods:** The present study was carried out in the Department of Biochemistry, Santosh Medical College, Ghaziabad. Prior to estimation anthropometric markers (weight, height, BMI, waist circumference, hip circumference, and waist-hip ratio) were done in all subjects followed by serum A1AT by ELISA (Elabscience, Catalog No: E-EL-H0109), serum cotinine by HPLC (high-pressure liquid chromatography). **Results:** The mean serum cotinine level was significantly raised in cigarette smokers as compared to non-smokers whereas mean serum A1AT level was significantly decreased in cigarette smokers as compared to non-smokers. This difference was found to be statistically significant ($P < 0.05$). **Conclusion:** Based on our findings and the other data in the study, we speculate that these biomarkers to the detection of smokers might be useful with a high risk of pulmonary and cardiovascular diseases developed by smoke-induced and will help to clinicians to formulate novel treating protocol and follow-up for their patients.

KEY WORDS: A1AT and anthropometric markers, cigarette smokers, serum cotinine

INTRODUCTION

In most of the world cigarettes are the most common form of tobacco used and each year 443,000 deaths occur in the United States (US). Due to rise of tobacco industry and population growth cigarette smoking (CS) and the use of other tobacco products is increasing in the developing world.[1]

Tobacco smoking is the inhalation of smoke from burned dried or cured leaves of the tobacco plant, most often in the form of cigarette.[2] Different kinds of cigarettes (flavored, hand-rolled, manufactured, filtered, and unfiltered), pipes, and cigars included as smoked forms of tobacco. The main form of tobacco smoked globally is cigarette smoking, particularly manufactured cigarettes, in some developed

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and developing countries other forms of smoked tobacco are predominant.[3]

In developed countries cigarette smoking, hereafter referred to as "smoking," is the largest single risk factor for premature death. In the United States, approximately one-fifth of the deaths are attributable to smoking and 28% of the smoking-attributable deaths involve lung cancer, 37% involve vascular disease and 26% involve other respiratory diseases. Approximately 80% of adult smokers initiate their tobacco use before 18 years of age as per the WHO estimates. Therefore, the fact that many adult smokers make smoking a significant public health problem by initiating their smoking habit as in adolescents age.[4]

Cigarette smoke is separated into the gaseous phase and particulate (tar) phase. a material that is trapped when the smoke stream is passed through the Cambridge glass-fiber filter that retains 99.9% of all particulate material with a size >0.1 μm is defined the tar or particulate phase. The particulate phase of cigarette smoke contains the condensable part of the gas phase. In the particulate phase aldehydes, ketones, organic acid, and alcohol are found.[5]

Body mass index (BMI) and waist-to-hip circumference ratio (WHR) are the simple measures and widely used anthropometric markers in clinical practice. The most widely used method to define thinness and fatness is BMI, a ratio of weight in kilograms divided by height in meters squared (kg/m^2). It has been correlated to morbidity and mortality risk in various populations (Willett *et al*., 1999).

It is also believed that combined use of BMI and WHR parameters of generalized and abdominal obesity may be better in identifying people at risk of cardiovascular disease (CVD) than either of them alone (Ardern *et al*., 2003, Meisinger *et al*., 2006) because they correlate well with each other. World Health Organization include 18.5–24.9 kg/m^2 for normal, 25.0–29.9 for overweight and >30 kg/m^2 for obesity recommended currently cut-offs of BMI (World Health Organization, 1997). International Diabetes Federation Criteria for Central Adiposity waist circumference male ≥90 cm and female ≥80 cm South Asian.

The nicotine absorbed is metabolized to cotinine an average of 70–80%. In adult smokers, a nicotine intake of approximately 1 mg can be estimated from a blood cotinine level of 71 nmol/L (12.5 ng/mL) using a conversion factor of 0.08 mg/24 h per nanogram per milliliter under steady-state conditions. The main biomarker used to distinguish tobacco users from people who do not use tobacco is cotinine, which reflects the extent of exposure, not how the exposure was derived.[6]

Alpha 1 antitrypsin (A1AT), also referred to as alpha1-proteinase inhibitor or SERPINA1 and is the prototypical member of the SERPIN (an acronym for serine proteinase inhibitor) family of protease inhibitors. The term SERPIN was introduced as by Carrell and Travis in 1985 to describe a superfamily of serine protease inhibitors of mammalian plasma.

A1-Antitrypsin (a1-AT) is synthesized mainly by hepatocytes, a 52-kDa glycoprotein. It protects the alveolar matrix from destruction by neutrophil elastase (NE), a serine protease capable of destroying most of the structural components of the alveolar wall in the lung parenchyma its primary function.[7] Accumulation of polymorphonuclear leukocytes and macrophages in the lungs caused by smoking. A1-AT is abundant in human plasma with concentrations in the 20–53 mM range in addition to its presence in the lung. Due to mutations of the a1-AT gene, the anti-NE protection on the alveolar surface is inadequate, resulting in unopposed proteolytic activity, eventually leading to lung destruction and the development of emphysema by the third or fourth decade of life, when plasma levels of a1-AT are below a protective threshold of approximately 11 mM.[8]

Although many studies have been conducted on biochemical markers in cigarette smokers, levels of A1AT and cotinine were not well documented. Their involvement and association in cigarette smokers are still not known and the results obtained by other studies are contradictory and have not been extensively studied. These markers have also been implicated in a several lung diseases, including lung, cancer, and emphysema, etc. Therefore, the objectives of the present study were to measure the levels of serum A1AT, cotinine in cigarette smokers and to study the association between these biochemical markers with anthropometric markers and the duration and number of cigarette smoked.

MATERIALS AND METHODS

The present study was carried out in the Department of Biochemistry, Santosh Medical College, Ghaziabad. Institutional ethical clearance was taken prior to the study (F. No SU/2018/528 {2}.

Inclusion Criteria

The age group of 18–60 years about 284 healthy cigarette smokers (without any systemic diseases) compared with age and sex-matched 284 controls (non-smokers) were included in the study.

Exclusion Criteria

Person with a habit of tobacco chewing along with smoking and taking other forms of smoke (bidi, hookah, cigar, etc.) and patients of tuberculosis, pulmonary disorders, coronary artery diseases, diabetes mellitus, renal failure, chronic liver diseases, thyroid dysfunction, anemia, malnourished individuals, were excluded from the study.

According to prevalence, used in the previous study[9] sample size is calculated

$$n = \frac{Z^2 \times p \times q}{d^2}$$

Where n is the sample size, Z is 1.96 (5% level of significance), p is prevalence, q is 1-p and d is 0.05 (95% of c.f.). According to this formula, sample size was 284 for cigarette smokers.

Cigarette smokers comprising the number of cigarettes per day and duration of cigarette smoking was recorded on participant proforma after taking detailed history. Based on the number of cigarettes per day and duration of cigarette smoking subjects were classified into different groups i.e. smoking 1–15 cigarettes/day <5 years are mild smokers in group I, 15–20 cigarette/day <5 years in group II, 15–20 cigarette/day 5–10 years moderate, and 15–20 cigarette/day >10 years are heavy smokers.[10] Out of total 284 cigarette smokers, 129 were in group I, 42 were in group II which were in mild group, 36 were in moderate and 77 were in heavy group smokers.

All aseptic precautions were taken; with a disposable syringe, about five mL of blood was drawn by veinpuncture from a peripheral vein. For the retraction of clot collected blood in clean dry glass tubes was allowed to stand for 30 min at room temperature. Then, it was centrifuged at 3000 r.p.m. for ten minutes to obtained the serum. The serum was stored at 4°C in the refrigerator for analysis.

Prior to estimation anthropometric markers (weight, height, BMI, WHR) were done in all subjects followed by serum A1AT by ELISA (Elabscience, Catalog No: E-EL-H0109), serum cotinine by HPLC (high-pressure liquid chromatography).

Statistical Analysis

Unpaired "t" test and one-way ANOVA were used to analyze all the data for statistical significance, using the SPSS 19.0.2 program for windows.

RESULTS

In the present study, out of total of 284 cigarette smokers, 272 were male and 12 were female. Mean age of the cigarette smokers and nonsmokers was 40.66 ± 11.08 years and 37.42 ± 9.73 years, respectively.

The cigarette smokers had significantly higher mean weight, BMI, waist circumference, and waist-hip ratio as compared to non-smokers. These differences were found to be statistically significant ($P < 0.05$).

The mean serum cotinine level was significantly raised in cigarette smokers as compared to non-smokers whereas mean serum A1AT level was significantly decreased in cigarette smokers as compared to non-smokers. This difference was found to be statistically significant ($P < 0.05$).

The mean serum cotinine level was significantly raised in cigarette smokers when adjusted with duration and number of cigarette smoked as compared to non-smokers. This difference was found to be statistically significant ($P < 0.05$).

The $P < 0.05$ which signifies significant variation in levels of serum cotinine and A1AT when compared among each other in terms of group means.

A1AT had negative correlation with cotinine ($r = -0.143$; $P < 0.000$) and ($r = -0.212$; $P < 0.000$) in cigarette smokers and non-smokers. Linear relationships were observed between the parameters.

DISCUSSION

Cigarette smoking that has spread all over the world is a reprehensible habit. Considerable research attests the adverse effects of chronic smoking on human health. In the development of many cardiovascular, pulmonary, and ocular diseases and also neurological disorders smoking has been implicated.[11]

Cigarette consumption has risen over the past two decades in India and most other countries. Reports reveal that the smoking rate is on continuous increasing. The WHO estimates suggest that if the current pattern of smoking continues, this 21st century is about to see 1 billion tobacco deaths.[12]

In the present study, Out of total 284 cigarette smokers, 272 were males and 12 were females. 15.14% of the cigarette smokers were in the age group 18-29 years followed by 27.11% within 30-41 years, 29.93% within 42-53 years, and 27.82 within 54–60years [Table 1]. According to study prevalence, our study indicates that male are more prone for smoke-related diseases than females. Same results were also obtained by other studies. Our finding is similar to the Townsend *et al*. who reported in the sub-Saharan Africa that the prevalence of cigarettes use was higher among males than females across all countries in the region.

About 20% of men aged 18 and over smoked compared with 17% of women according to ash fact sheet in 2016. Smoking prevalence is highest among young adults 23% of those aged 16–24 and 24% among the 25–34 age groups. Smoking continues to be the lowest among people aged 60 and over. Although they are more likely than younger people to have ever been smokers, they are more likely to have stopped smoking.

In the present study prevalence of cigarette smoking among people aged 30 years and above and this was much higher among males (95.77%) than females (4.23%). A clustered community –based study in 2001 with about 50% of adult males between 30 and 60 years found to be smokers and very few females admitting to smoking similar finding has been reported from

Table 1: Distribution of age group among cigarette smokers (n=284)

Age group (years)	Male		Female		Total	
	No	%	No	%	No	%
18–29	41	15.07	02	16.67	43	15.14
30–41	75	27.57	02	16.67	77	27.11
42–53	81	29.79	04	33.33	85	29.93
54–60	75	27.57	04	33.33	79	27.82
Total	272	95.77	12	4.23	284	100

Delhi by Chhabra *et al*.[13] The young often smoke because their peers smoke reported by these studies in urban areas. Their most common reason was their film hero who smokes. In the rural areas, many people were unaware of the hazards of smoking.[14]

In developing and developed countries females start smoking later than males due to the smoking has been considered socially unacceptable for women (with exceptions in certain areas of India, Nepal, Papua New Guinea, northern Thailand, and for Maoris). Religious constraints may be the reason, for example, to buy cigarettes in Muslim countries women have had less spending power than men; traditional methods of smoking are adhere by rural women, for example., hubble-bubble pipes, and are therefore a lower dosage of tobacco they exposed; and women use tobacco in other forms as chewing tobacco is used in some areas, such as parts of India and the Middle East (Subramanian, 2004). Where it is culturally less acceptable for women to smoke, there may be significant underreporting of smoking among women in countries.[15]

Health effects associated with reproductive health such as problems associated with pregnancy, use of oral contraceptive, menstrual function, and cancers of the cervix and bladder are more prone in women smoker or who exposed with smokers. irregular menstrual cycles and increased menstrual discomfort may also caused by smoking. Women who are smokers may also have an earlier menopause, which increases chances of getting osteoporosis, heart disease, and other conditions for which estrogen provides a protective effect. The risk of sudden infant death syndrome may also increase when a pregnant woman smokes.

Age, height, weight, BMI, Waist Circumference, and Waist-hip ratio are simple and valid anthropometric measures for the assessment of risk of obesity and other systemic diseases in smokers. In the present study, the cigarette smokers had significantly higher mean BMI, waist circumference, and waist-hip ratio as compared to non-smokers [Table 2].

Some studies reported that measures of abdominal adiposity such as WC and WHR are better and simple markers of cigarette smoked in smokers, other studies claim that central adiposity measures such as WC and WHR do not provide additional prognostic information than BMI alone.

The amount of visceral adipose tissue (VAT) is indicated by Waist circumference or waist-to-hip ratio (WHR). WHR is higher in smokers than in nonsmokers indicated by several cross-sectional studies. The number of pack years of smoking is positively associated with WHR and between WHR and the number of cigarettes smoked there is a dose-response relation. WHR is negatively associated with the time since smoking cessation in former smokers.[16]

A study found that CS can lower testosterone levels in men. Smoking caused a significant drop in serum testosterone levels in male dogs. Overall, these findings imply that, in addition to elevated cortisol, an imbalance in male and female sex hormones, as well as a decrease in testosterone in males, may contribute to the effect of smoking on VAT.[17] Smoking has been linked to lower weight and BMI in a number of studies. In addition, smoking has been linked to insulin resistance and type 2 diabetes. Current smokers had lower mean BMI, WC, and body fat percentage than nonsmokers among Caucasian men and women. In smokers, age-adjusted mean WC and body fat rose with the number of cigarettes smoked per day, but not in a way that was connected to BMI. Over a 50-month follow-up period, Basterra-Gortari *et al*. discovered that active smokers gained more weight than never smokers. Nicotine is a well-known appetite suppressor, with numerous studies demonstrating that it reduces food intake in rats.[18] As a result, one may predict smokers with slower nicotine metabolism to have a lower BMI, however, our hypothesis was not confirmed.

It is possible that persons who like cigarettes may also like foods that are rich and high in fat or sugar, which counteracts any appetite suppressant characteristics of nicotine. Heavy smokers tend to have greater body weight than light smokers or nonsmokers remains unanswered. One explanation could be that heavy smokers are more likely to adopt behaviors favoring weight gain (e.g., low physical activity, unhealthy diet, and high alcohol intake) than are light smokers or nonsmokers. Smokers eat less fruit and vegetables adopt unhealthy patterns of nutrient and calorie intake than do nonsmokers.[19]

Number of biochemical markers such as nicotine, cotinine, and carbon monoxide in the expired air and carboxyhemoglobin in blood has been used to validate claims of non-smoking. Levels of nicotine and carbon monoxide/carboxyhemoglobin are easier to determine but can be raised through exposures unrelated to smoking such as traffic emissions and diet. Cotinine is possibly the best marker for situations where accuracy is paramount. It is one of the most frequently used biomarkers for exposure

Table 2: Anthropometric measurements of cigarette smokers and non-smokers (*n*=568)

Parameters	Non-smokers (*n*=284) Mean±SD	Cigarette smokers (*n*=284) Mean±SD	*P* value	*t* value	95% Confidence interval for mean	
					Lower	Upper
Height (cm)	166.23±3.73	165.89±3.52	0.425	0.599	158.0	178.0
Weight (kg)	63.56±6.82	66.18±5.16	0.001	5.16*	48.0	76.0
BMI (kg/m^2)	23.00±2.10	24.09±1.63	0.001	6.93*	17.60	27.90
WC (cm)	78.57±4.51	83.16±4.62	0.189	11.98*	70.0	91.0
HC (cm)	90.92±4.44	89.37±3.76	0.006	−0.446	80.0	98.0
WHR	0.86±0.03	0.93±0.03	0.162*	27.39*	0.84	0.98

to environmental tobacco smoke in body fluids and widely practical as a biomarker of nicotine uptake and exposure to both active and secondhand tobacco smoke.[20]

In the present study, the mean serum cotinine level was significantly raised in cigarette smokers as compared to non-smokers and also increased when smokers adjusted with age and duration and number of cigarettes smoked [Tables 3-5].

The present study also shows the correlation of cotinine with serum A1AT level in mild group I, mild group II, Moderate and heavy cigarette smokers, respectively. Cotinine had a negative correlation serum A1AT ($r = 0.458$, $P < 0.006$) in mild group II and moderate cigarette smokers, respectively Linear relationships were observed between the parameters [Table 6].

Balhara YPS, Jain R 2013 detected urinary cotinine by the highest sensitivity and specificity method for smoking using ELISA kits of Calbiotech.[21] Kulza *et al*. 2012 found that the concentration of salivary cotinine was increased in cigarette smokers, detected by using high-performance liquid chromatography with diode array detection. Mean concentrations of cotinine were found to be highly increased suggested that saliva cotinine is useful in the assessment of tobacco smoke.[22] Nuca *et al*. 2012 By using NicAlert™ Saliva tests and found that 44.06% were active smokers, 16.43% were non-smokers, and 39.50% were passive smokers.[23]

In the coronary artery, Risk Development in (Young) Adults study, serum cotinine levels were higher in black smokers than in white smokers, despite lower estimated daily nicotine exposure among black smokers.[24]

Cotinine levels have earlier been used to validate the smoking status of an individual. These biomarkers have also been used in epidemiological studies, to assess the effects of tobacco use on human health, as measures to estimate the exposure to environmental tobacco smoking, and for assessment of the efficacy of interventional methods on cessation of smoking.

Alpha-1 antitrypsin deficiency is a genetic disorder that causes deficiency of the protein, A1AT. The lack of this protein may

Table 3: Serum levels of cotinine and A1AT in cigarette smokers and non-smokers (*n*=568)

Parameter	Non-smokers (*n*=284) Mean±SD	Cigarette smokers (n=284) Mean±SD	*t* value	*P* value	95% Confidence interval for mean		Normal value
					Lower	Upper	
Serum cotinine	14.20±5.15	24.20±5.00	2.38	0.013	11.20	36.50	3–20 ng/mL
Serum A1AT	20.80±11.98	13.06±18.00	−1.06	0.027	3.31	77.53	18.59–81.15 ng/mL

Table 4: Distribution of serum cotinine and A1AT levels according to duration and number of cigarette smoked in cigarette smokers (*n*=284)

Parameter	1–15 C/D <5 years Mean±SD	15–20 C/D <5 years Mean±SD	15–20 C/D 10 years Mean±SD	15–20 C/D >10 years Mean±SD	*P* value
Serum cotinine (mg/dl)	24.16±5.00	24.66±5.00	23.71±5.00	24.62±5.00	0.348
95% confidence interval for mean					
Lower	21.79	22.76	25.10	22.73	
Upper	24.29	25.59	27.46	25.50	
A1AT	13.68±20.75	12.34±17.41	12.21±8.28	13.19±15.86	0.098
Lower	12.41	10.03	10.34	11.80	
Upper	14.26	12.71	14.80	19.48	

Table 5: ANOVA analysis and unpaired "*t*" test of serum cotinine and A1AT level according to duration and number of cigarette smoked in cigarette smokers

Parameter	1–15 C/D<5 years	15–20 C/D<5 years	15–20 C/D 5–10 years	15–20 C/D>10 years	F critical
	Sum of squares	Mean square	F value	*P* value	
Serum cotinine					
Between groups	391.490	130.497	5.565	0.001	3.032
Within groups	6542.533	23.448			
A1AT					
Between groups	1509.215	503.072	3.96	0.098	
Within groups	99833.705	357.827			

Table 6: Correlation between serum A1AT with serum Lp (a) and cotinine levels in cigarette smokers and non-smokers (*n*=568)

Parameter	Correlation analysis	SerumCotinine
Serum A1AT	Correlation coefficient (r)	−0.212
	S.E.OF "r"	0.041
	t statistic	−5.159
	P value	0.000
	R -square	0.043

cause lung disease over time. Alpha-1 antitrypsin deficiency is often undetected for many years, and although treatable, the disease is incurable.

In our study, the mean Serum A1AT level was significantly decreased in cigarette smokers as compared to non-smokers. The mean serum A1AT level also was significantly decreased in cigarette smokers when adjusted with duration and number of cigarettes smoked as compared to non-smokers. This difference was found to be statistically significant ($P < 0.05$) [Tables 2-5].

Different studies demonstrated change in A1AT activities in serum of patients with COPD; which are more commonly associated with cigarette smoking habit.[25] One more study also shows increased A1AT activity in cigarette smokers compared to healthy nonsmokers which suggest its role in mediating some of the chronic health hazards of smoking such as COPD, TB, and other lung diseases; which were found to be associated with an increased levels of A1AT and also reported a positive correlation between pack size and A1ATactivity.[26]

A1AT level was lower in COPD patients with smoking as compared to COPD patients without smoking. The present study shows the significant difference in serum AAT level between the two groups ($P < 0.05$). This study supports the data of previous studies Ogushi *et al*. 1991, Senn *et al*. 2008 and Deore Deepmala *et al*. 2012.[27,28]

Higashimoto *et al*. reported in a cross-sectional study that serum alpha-1 antitrypsin levels were inversely correlated with cigarette smoke in Japanese patients with COPD.[29] Furthermore, Senn *et al*. reported that serum alpha-1 antitrypsin levels were inversely correlated with cigarette smoke and FEV1 in the general population.[28]

These findings could also explain the role of AAT in the development of COPD; its decreased levels in the blood resulting from systemic inflammation, meeting the elevated levels of alveolar neutrophil elastase, and proving to be a marker for increased risk of COPD development, as a result of low-grade lung inflammation. Direct exposure of α1-antitrypsin to gas phase causes loss of elastase inhibitory capacity leading to the formation of reactive free radicals from smoke that inactivate a 1-antitrypsin by oxidizing methionine 358 terminal amino acid.[30]

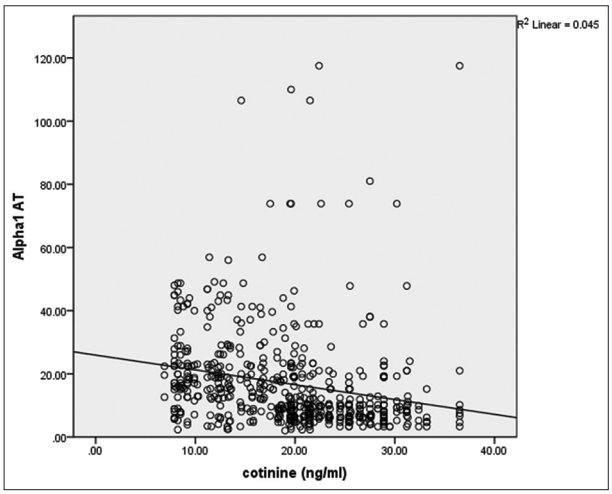

Figure 1: Correlation of serum A1AT with serum cotinine in cigarette smokers and non-smokers

CONCLUSION

Cigarette smoking may increased serum cotinine represents exposure of smoke, decreased serum A1AT modify the deleterious effect of smoking on these markers, indicating genetic susceptibility to smoking-related diseases.

Based on our findings and the other data in the study, we speculate that these biochemical markers might be useful biomarkers for the detection of smokers with a high risk of developing smoke-induced pulmonary and CVD and will help to clinicians to formulate novel treating protocol and follow-up for their patients.

Limitations

The study was limited to the population residing in and around Haldwani and their involvement in the study especially in case of females. Lack of fund, time, and manpower prevented the inclusion of a large study group and other sensitive biochemical markers of cigarette smoke.

Future cross-sectional, longitudinal, and mechanistic studies are needed to determine how CS, anthropometric markers, A1AT and cotinine are useful in large populations of cigarette smokers with the inclusion of clinically relevant endpoints are needed to extend these findings.

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In the name of the lord we pray and receive. Before proceeding further, I thank the almighty for all the kindness and grace he has showered upon me.

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Original Article

Is outcome of tympanoplasty affected by site and size of perforation?

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Introduction: Chronic otitis media (COM) is one of the most common otorhinological health problems in India. Tympanoplasty is a surgical procedure for the removal of infection and restoring the function of the middle ear. It has been seen that hearing loss is directly related with the size of perforation. So greater the size of perforation more is the loss and one expect the same improvement in hearing once the tympanoplasty is successful with intact ossicles. In patients with healthy middle ear mucosa and intact ossicles, outcome of tympanoplasty is still variable and it may depend on site and size of tympanic membrane (TM) perforation. In patients with healthy middle ear mucosa and intact ossicles, outcome of tympanoplasty is still variable and it also depends on site and size of TM perforation. **Materials and Methods:** This prospective study was carried out on 42 patients who underwent tympanoplasty for the mucosal type of COM during 1 year period. The result was assessed in terms of successful graft uptake and hearing improvement in terms of Post-operative Air Bone gap hearing gain. **Observations and Results:** Most of the cases affected were in the age group of 18–25 years and females were mostly affected by COM. Site and Size of the perforation was not a determining factor for the successful graft uptake. The effect of perforation site and size on the improvement of hearing was also found to be not associated. **Conclusion:** There was no statistical association between outcome of tympanoplasty with size and site of perforation.

KEY WORDS: Chronic otitis media, hearing loss, site of perforation, size of perforation, tympanoplasty

INTRODUCTION

The term chronic otitis media (COM) defines as chronic inflammation of the middle ear and mastoid cavity, which presents with recurrent ear discharge or otorrhoea through a tympanic membrane (TM) perforation. It is an umbrella term for a group of complex infective and inflammatory condition affecting the middle ear.

COM is one of the most common otorhinological health problem in India. However, with the increase in healthcare facility and better antibiotics, there is a decline in the incidence of complications but they still occur due to poor socio-economic conditions, lack of consciousness about health care and accessibility of trained specialist in rural settings. India falls into countries with the highest prevalence of >4%.[1] However, COM severity and incidence remains high, more so in developing countries and among population of low socioeconomic status. The prevalence of COM in the world is around 65–330 million/year.[2]

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Mucosal type is associated with central perforation with or without active ear discharge involving middle ear ossicles into a variable extends. Squamous disease presents as an early acute phase with essentially mucosal and bony pathological changes which continue to a late chronic phase with well-established intractable mucoperiosteal disease. The recurrent episode of otorrhoea and mucosal changes are characterised by osteogenesis and bone erosion which is usually followed by the involvement of temporal bone and intracranial extension. The risk of complications is high in squamous type in comparison to mucosal type.

Mucosal type is treated with aural toilet and antibiotics followed by tympanoplasty as the definite surgical treatment. On the other hand, squamous type cannot be simply stopped by antibiotics, hence various type of mastoidectomy is the treatment of choice depending on extent of cholesteatoma.

Tympanoplasty is a surgical procedure for the removal of infection and restoring the function of the middle ear. The procedure aims to eradicate disease in the middle ear and reconstruct the hearing mechanism along with TM grafting.

Tympanoplasties are classified as types I–V, wherein type I involves reconstruction of only the TM, while types II–V involve reconstruction of the ossicular chain with or without repair of the TM.[3] The choice of incision depends on several factors including the nature of the anticipated pathology and reconstruction, the desired degree of exposure of the tympanic cavity, the state of the patient's ear canal and external auditory meatus, whether additional mastoid or atticotomy procedures are contemplated, and preference of the otologic surgeon.

There is number of studies in literature that stresses on site and size as the determining factor in the success of tympanoplasty. One group believes that larger perforation carries a high risk for re-perforation and concludes that the high success of tympanoplasty is inversely related to size of perforation. Many groups of otologists believe that it's the technique of procedure that matter and is a deciding factor for a successful outcome. Some has classified perforation into groups, one with more than 50% perforation and other with equal or <50%, higher success is seen in perforation smaller than 50%. Perforations confined to the anterior part are technically difficult to close because of more space in the anterior recess and thereby increasing the possibility of residual perforation in the anterior part of TM.

It has been seen that hearing loss is directly related with the size of perforation. So greater the size of perforation more is the loss and one expect the same improvement in hearing once the tympanoplasty is successful with intact ossicles. In patients with healthy middle ear mucosa and intact ossicles, outcome of tympanoplasty is still variable and it may depend on site and size of TM perforation. The present study has been undertaken to assess the outcome of tympanoplasty in terms of graft uptake and hearing and its association with the site and size of perforation.

MATERIALS AND METHODS

This prospective study was carried out in the Department of Otorhinolaryngology and Head and Neck surgery, Rohilkhand Medical College and Hospital, Bareilly, a tertiary care and teaching hospital in western Uttar Pradesh for a duration of 1 year and included a total of 42 patients who underwent tympanoplasty for the mucosal type of COM.

The cases were selected as per laid down inclusion and exclusion criteria. Inclusion Criteria included all patients above 18 years of age with mucosal type of COM and willing to participate in this study. Patients with squamous type of COM, having sensor neural type of hearing loss or with the previous history of any Otologic procedure were excluded from the study.

Pure Tone Audiometry was performed on all patients before surgery and after surgery at 3rd month. The site and size of perforation was recorded by following standard guidelines. The TM was divided into four quadrants: Antero-superior, Antero-inferior, Postero-inferior and Postero-superior. Size was categorised as small central if perforation is equivalent to one quadrant; Subtotal perforation, if perforation size is equivalent to 2–3 quadrant and if all the four quadrants were involved then it was labelled as total perforation.

The result was assessed in terms of successful graft uptake and hearing improvement in terms of Post-operative AB gap <25 dB and Post-operative hearing gain >10 dB. The result so obtained was statistically analysed using Statistical Package for the Social Sciences version 22.

OBSERVATIONS AND RESULTS

Most of the cases affected were in the age group of 18–25 years followed by 26–35 years [Figure 1]; females were mostly affected by the disease in 57.14% cases [Figure 2].

Size of the perforation was not a determining factor for the successful graft uptake as the result was statistically not significant [Table 1].

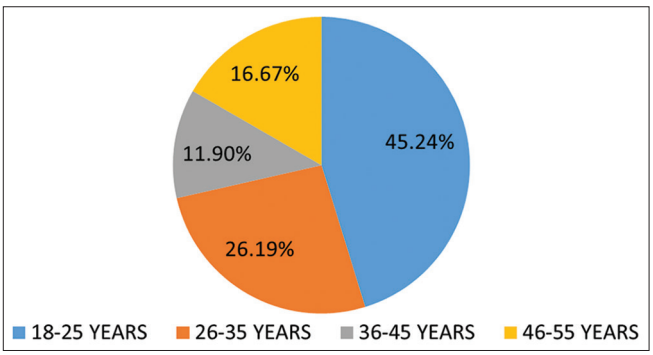

Figure 1: Age wise distribution of cases

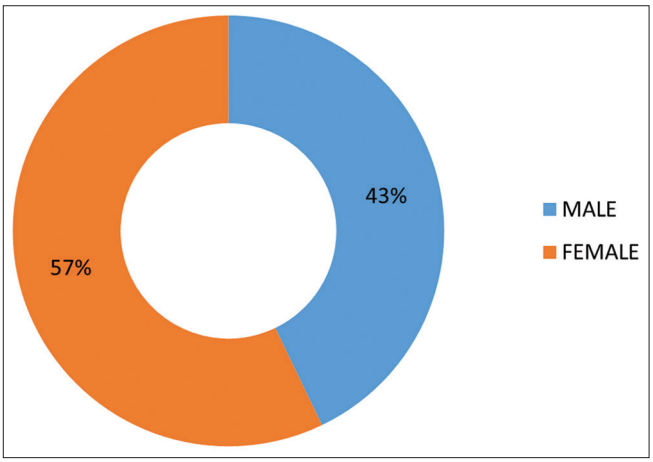

Figure 2: Gender distribution of cases

The effect of perforation size on the improvement of hearing was found to be statistically not significant [Tables 2 and 3].

The effect of perforation site on graft uptake was found to be not significant [Table 4].

However, the effect of site of perforation on improvement in hearing was found to be not significant [Tables 5 and 6].

DISCUSSION

In our study, the most common age group affected was 18–25 years with 19 (45.24%) cases and it goes with study done by Hair Krishna and Sobha Devi.[4] and Basak *et al*.[5] who also found that mucosal type of COM is more prevalent in the age span of 10–30 years. The probable reason could be acute suppurative otitis media is more frequent among children and the illness is mostly acquired during infancy or childhood. Unless addressed, this disease remains throughout early and middle adulthood. As a result, young people were more likely to be affected.

In our study, females were more commonly affected than males (57.14%). Basak *et al*.[5] also found female predominance in their study. Improper nourishment and lower education level should be the probable causes for the higher incidence in females.

Kumar *et al*.[3] and Onal *et al*.[6] concluded that the success of tympanoplasty matters on multiple factors, one of them is the location of perforation. They observed the highest failure rates with anterior perforations. This is most likely owing to a lack of blood flow to the anterior portion and surgical access to the area. However, our study has witnessed reasonable successful outcomes among cases with anterior perforations. Study done by Gonzalez *et al*.[7] found posterior perforations to have a higher success rate than subtotal perforations.

Our study has found a statistically not significant outcome based on the location of perforation and goes in agreement with the study done by Sharma *et al*.[8] who also observed no significant difference between the location of perforation and outcome of tympanoplasty.

Lee *et al*.,[9] Onal *et al*.,[6] Chrobok *et al*.,[10] Wasson *et al*.[11] and Nirwan and Somashekara.[12] concluded in their studies that size of perforation affects the outcome of tympanoplasty and observed that larger perforation had poorer outcomes in compare to small perforations. Emir *et al*.[13] also found that >50% TM perforation had significantly poorer hearing results and a lower rate of graft success. Whereas, Alshehabi *et al*.,[14] Sharma *et al*.,[8] Singh *et al*.,[15] Naderpour *et al*.[16] and concluded that the size of perforation doesn't affect the outcome of tympanoplasty surgery. Onal *et al*.[6] suggested that graft uptake is better in posterior perforations than anterior perforations, and smaller perforations had better graft uptake than bigger perforations.

Table 1: Perforation size and graft uptaker

Perforation size	Number of patients (%)	Graft uptake	Graft rejected	Success percentage	*P*-value
Small central perforation	13 (30.95)	13	0	100	0.114
Subtotal perforation	16 (38.1)	15	1	93.75	
Total perforation	13 (3095)	10	3	66.66	

Table 2: Perforation size and post-op AB gap

Perforation size	<25 dB post-op AB gap	Success percentage	*P*-value
Small central perforation	12	92.30	0.09
Subtotal perforation	16	100	
Total perforation	11	84.61	

Table 3: Perforation size and hearing gain

Perforation size	Hearing gain>10 dB	Success percentage	*P*-value
Small central perforation	13	100	0.197
Subtotal perforation	14	87.5	
Total perforation	10	76.92	

Table 4: Perforation site and graft uptake

Perforation site	Number of cases (%)	Graft uptake	Success percentage	*P*-value
Antero superior+Antero inferior	10 (23.81)	10	100	0.161
Antero superior+Antero inferior+Postero inferior	9 (21.43)	9	100	
Antero superior+Antero inferior+Postero inferior+Postero superior	23 (54.76)	18	78.26	

Table 5: Perforation site and post-op AB gap

Perforation site	<25 DB post-op AB gap	Success percentage	*P*-value
Antero superior+Antero inferior	9	90	0.152
Antero superior+Antero inferior+Postero inferior	9	100	
Antero superior+Antero inferior+Postero inferior+Postero superior	21	91.30	

Table 6: Perforation site and hearing gain

Perforation site	Hearing gain>10 dB	Success percentage	*P*-value
AS AI	10	100	0.249
AS AI PI	8	88.88	
AS AI PS PI	18	78.26	

AS: Antero superior, AI: Antero inferior, PI: Postero inferior, PS: Postero superior

Wasson *et al*.[11] stated that size of the perforation also affects the hearing outcome. The study finds a direct correlation of the amount of hearing loss with the size of perforation. However, other researchers claimed that the perforation's size was less important than the perforation's location. There is a school of thought that suggests that hearing loss caused by a tiny perforation is minor and is mostly caused by other causes. As a result, patients' hearing improves less when such perforations were closed. Kumar *et al*.[3] found increase of hearing loss with the increase in the size of TM.

CONCLUSION

The disease is more seen among young population with more prevalence among females. However, there is no statistical association between outcome of tympanoplasty with size and site of perforation. Hence, it's the technique of surgery that influences the outcome rather than site and size of perforation.

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Case Report

Ovarian ectopic pregancy: Rarest of the rare!

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Background: Primary ovarian pregnancy being one of the rarest forms of ectopic pregnancy, i.e., where gestational sac is implanted in the ovary. Following natural conception, the incidence ranges from 0.5% to 3% of all ectopic pregnancies and having 1 case in 7000–40,000 deliveries. One of the important risk factors for ovarian pregnancy is in the use of intra uterine contraceptive devices (IUCD). **Case Report:** We report here one such uncommon case of ovarian ectopic pregnancy. Our patient was a 20-year-old woman with history of one previous abortion, who presented with severe abdominal pain and bleeding per vagina. Transvaginal sonography revealed empty uterine cavity and hyperechoeic lesion in right adnexa. During laparotomy, ruptured ovarian ectopic pregnancy was being diagnosed, and salpingo-oophorectomy was done. Histopathological examination confirmed it to be an ovarian ectopic pregnancy. **Conclusion:** Ovarian gestations until unruptured, can be detected ultrasonographically but in cases of ruptured ectopic gestation, differentiation of ovarian from other tubal gestation is a difficult task. Histopathology is thus the gold standard for the confirmation of its diagnosis.

KEY WORDS: Histopathology, intra uterine devices, ovarian ectopic pregnancy

BACKGROUND

Ectopic gestation is a complication of pregnancy where an embryo attaches itself anywhere outside the uterine cavity. It is the most frequent emergency in gynecology and the reason for pregnancy-related deaths during the first trimester of pregnancy.[1] In about 95% of ectopic pregnancies fallopian tube is the site while the residual 5% cases occur in the ovary, cervix, and abdomen.[1] Ovarian ectopic pregnancy (OEP) is a rare site for ectopic gestation and accounts for approximately 0.5–3% of all ectopic gestations.[2] The incidence ranges from 1 in 7,000 to 1 in 40,000 live births.[3] The first case was reported by St. Maurice in 1689.[4]

OEP occurs when a fertilized ovum implants on the surface of the ovary and usually terminates with rupture in the first trimester, which can lead to internal hemorrhage and hypovolemic shock. Although the ovary should be able to accommodate the expanding pregnancy more freely than the fallopian tube, still there are more chances of rupture at an early stage.[1] Overall, 91% of OEPs end in rupture during the first trimester, 5.3% end in the second trimester, and 3.7% end in the third trimester.[5] OEP shares the traditional risk factors with tubal pregnancy, but a disproportionate association with the use of an IUD has been observed.[6] Role of USG in diagnosing a case of OEP has been described but generally the patients present with ruptured ectopic with a circulatory collapse thus diagnosing OEP preoperatively on sonography is not an easy task. Finding the diagnosis to be intricate, the final diagnosis is thus based on operative emergency laparotomies and histopathological assessment.

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The Spiegelberg criteria for diagnosing OEP[7]

a. The location of the gestational sac should be in the region of the ovary.
b. The ovarian ligament should attach the ectopic pregnancy to the uterus.
c. Ovarian tissue in the wall of the gestational sac should be proved histologically.

d. The fallopian tube on the side being involved should be intact.

CASE REPORT

A 20-year-old patient with obstetric formula $G_2P_{0+1}L_0$ at 5 weeks and 3 days Period of gestation was admitted with pain in the lower abdomen for 1 day, and spotting per vagina for 5 days. Her previous menstrual history is normal. On examination, she had pallor and tachycardia. The left uterine adnexal region was not palpable, while there was tenderness and guarding in the right iliac fossa. Per speculum examination showed blood coming through OS. On pre vaginal examination, uterus was anteverted, normal size, tender, right fornix was fixed, left fornix free, non tender. Transvaginal ultrasonography revealed an empty uterine cavity with a hyperechoic lesion in the right uterine adnexa. Gross amount of free fluid with dense internal echoes was observed in the peritoneal cavity. On laparoscopic exploration, the uterus and bilateral fallopian tubes were normal. The left ovary was absolutely normal, while the right ovary appeared enlarged with blood oozing from its surface. Blood in the peritoneal cavity was observed. Right, salpingo-oophorectomy was carried out. On histopathological examination, grossly, we received a specimen or right ovary and fallopian tube. Fallopian tube appeared normal measuring 5 cms in length, outer surface grey white smooth, cut section showed patent lumen. Right ovary measured 4 × 3.2 × 2.8 cms, external surface graybrown with a ruptured hemorrhagic area on one side ms 2.2 × 1.5 cms. Cut surface showed solid hemorrhagic area ms 2.5 × 2.3 cms [Figure 1a]. Furthermore, received peritoneal clots as multiple dark brown soft tissue pieces ms altogether 12 × 10 × 2 cms [Figure 1b]. Microscopic examination showed sections from ovary consisting of chorionic villi lined by cytotrophoblast and syncytiotrophoblasts within the ovarian tissue, large hemorrhagic areas were also noted [Figure 2a and 2b]. Sections from peritoneal clots also showed chorionic villi lined by cytotrophoblast and syncytiotrophoblast [Figure 2c]. Sections from the fallopian tube showed tissue lined by tall columnar pseudostratified epithelium with no evidence of products of conception [Figure 2d]. Thus a confirmatory diagnosis of ovarian ectopic pregnancy was given.

Figure 1: (a) Right ovary with a ruptured hemorrhagic area on one side. (b) Peritoneal clots

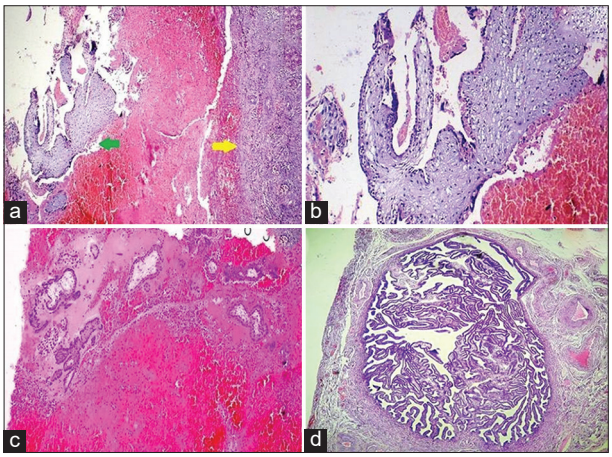

Figure 2: (a) Ovarian tissue (➡) and villi lined by trophoblastic cells (⬅) (H and E ×40). (b) Villi lined by cytotrophoblast and syncytiotrophoblast (H and E ×100). (c) Peritoneal clots showing presence of villi within hemorrhagic areas (H and E ×40). (d) Right fallopian tube showing normal histology (H and E ×100)

DISCUSSION

OEP is a rare form of ectopic gestation, when a fertilized ovum implants on the surface of the ovary, having poor symptoms to be diagnosed clinically and on ultrasonography.[3] It can be further classified as primary and secondary in which primary OEP usually occurs because of ovulatory dysfunction and the ovum is fertilized within the follicle itself, before the follicle being expelled from the ovary.[3] Secondary OEP occurs when fertilization takes place within the fallopian tube and the conceptus is regurgitated and implanted in the ovarian stroma.[3] (nurse) The cause of OEP remains obscure, including history of IUCD use, pelvic inflammatory disease (PID), sexually transmitted infections (STIs), using assisted reproductive techniques, previous pelvic surgeries, endometriosis, prior ectopic pregnancy, salpingitis, rising maternal age, multi-para, and/or infertility.[8] The true reason behind abnormal implantation is not clear. There are theories suggesting the abnormal implantation in the ovary:[6]

1. Embryo migration is related to the presence of certain conditions that cause fallopian tube epithelial damage that alters tubal motility.
2. An improper release of the ovum from the ruptured ovarian follicle.
3. Thickened tunica albuginea due to inflammation.

Role of IUCD use is found in 14–30% of patients having non-ovarian extra-uterine gestation while in 57–90% of patients having primary ovarian pregnancy.[9] The reason might be altered tubal motility, thus facilitating the process of implantation within the ovary. These IUCDs do prevent the implantation within the uterine cavity but have no provision for protection against ovarian implantation.[6] In 28% of the patients, OEP can be misdiagnosed as a ruptured corpus luteal cyst intra-operatively.[10] Suspicion is made during laparoscopy or laparotomy, but confirmation is done only by histopathology.[6]

CONCLUSION

Incidence of ovarian pregnancy is on the rise due to increased incidence of infertility and the use of assisted reproductive techniques. Ovarian gestations until unruptured can be detected ultrasonographically but in cases of ruptured ectopic gestation, differentiation of ovarian from other tubal gestation is a difficult task. Management of such cases is laparoscopic resection. Histopathological diagnosis is considered as confirmatory and gold standard.

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