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RESEARCH ARTICLE

EMERGENCY LAPAROTOMIES: VALIDATING THE ROLE OF SPINAL ANESTHESIA IN HIGH RISK CASES. A RETROSPECTIVE, FACILITY BASED OBSERVATIONAL STUDY IN SRINAGAR, GARHWAL, UTTARAKHAND

Prof.(Dr.) Biant Singh¹, Dr. Manpreet Kour², Dr. Shwetabh Pradhan³ and Prof.(Dr.) Surinder Singh⁴

1. Professor and Head Department of Surgery VCSG Govt. MS&RI Srinagar-Garhwal Uttarakhand 246174.
2. Trainee Observer VCSG Govt. MS&RI Srinagar-Garhwal Uttarakhand 246174.
3. Assistant Professor Department of Surgery VCSG Govt. MS&RI Srinagar-Garhwal Uttarakhand 246174.
4. Professor and Head Department of Anesthesia, VCSG Govt. MS&RI Srinagar-Garhwal Uttarakhand 246174.

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Abstract

Introduction: Perforation peritonitis is very rampant in hilly areas of Garhwal due to excessive consumption of alcohol, smoking and stresses of life due to difficult terrain and working conditions. Most of the patients with co-morbidities like COPD have higher pulmonary related complications following surgery under G.A. It is a challenge and concern for surgeons and anesthetists to manage and provide optimal care to these patients. The study validates the role of spinal anesthesia in such cases.

Materials And Method: We reviewed all cases of emergency laparotomies done between Jan 2019 and June 2020. Ninety cases were given spinal anesthesia as sole anesthetic agent out of which sixty cases were ASA IV and thirty cases were ASA III. Outcome in all cases was analyzed and recorded.

Results: All cases were adequately operated and outcome was successful in all except three cases which required G.A due to prolonged surgeries. None needed mechanical ventilatory support post operatively. Mean hospital stay was seven days and there was no report of major renal or respiratory complications.

Conclusion: Spinal anesthesia is a safe option and alternate to G.A in high risk emergency laparotomies minimizing the requirement of ventilatory support in rural tertiary care hospitals where critical care facilities are compromised.

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Introduction:-

Preoperative careful risk assessment and safe surgery under carefully chosen anesthesia technique is the corner stone of enhanced recovery programmes across the surgical specialities. Regional anesthesia was advocated for emergency operations in 1930^[1]. Compared to normal population post op complications are 9.5 times more frequent in patients with pre-existing pulmonary diseases^[2]. Patients with COPD have shown 5-13 times higher mortality risks^[3]. Upper abdominal surgical procedures enhance post op pulmonary complications under G.A due to reduced functional pulmonary residual capacity in early post op period^[4]. Non availability of modern ventilatory care makes mortality rates very high in immediate post op period. The high mortality may be due to effects of G.A and

Corresponding Author:- Prof.(Dr.) Biant Singh

Address:- Professor and Head Department of Surgery VCSG Govt. MS&RI Srinagar-Garhwal Uttarakhand 246174.

intubation with improper mechanical ventilation of already compromised lungs, as well as excessive use of long acting opioids for severe pain control which may further effect the pulmonary functions and leads to dependency on mechanical ventilation besides its effects such as bronchospasm, V/Q mismatch, atelectasis, and residual anesthetic or muscle relaxant effects^[5]. Spinal anesthesia may be an attractive and safe alternative to G.A since neuroaxial blockade has minimal respiratory effects even at higher levels. Besides certain retrospective^[6] and prospective^[7] observational studies have also shown that patients with COPD have better outcome under spinal anesthesia. Utilization of spinal anesthesia for emergency abdominal surgery has been reported with benefits for high risk cases having uncontrolled hyperthyroidism and severe myasthenia gravis^[7,8].

Collins et al have reported the advantages of S.A with no risk of intubation related airway complications, minimal risk of unrecognized hyperglycemia in a diabetic patient, excellent muscle relaxation, decreased surgical bed oozing and rapid return of bowel functions^[9,10,11]. Spinal anesthesia does not require the aerosol generating procedure thus minimizing the transmission risk of airborne infections rendering it safe in mildly symptomatic covid 19 patients as reported by SA Lie et al^[12,13].

Materials And Method:-

We conducted an observational study and reviewed all emergency laparotomies done between Jan 2019 and June 2020. Ninety cases were given spinal anesthesia as sole anesthetic agent. The anesthetic drug used in our hospital was bupivacaine at L2, L3 level. Additional drugs pentazocine, aminophylline and hydrocortisone were required in 10 patients. Most of our laparotomies were performed with a full midline incision. Sixty cases were ASA IV and thirty ASA III. The cases selected for the study were adults with evidence of COPD and co-morbidities. Records of all the patients were reviewed to determine the gender, age, diagnosis, indication of surgery, type of surgery performed, ASA classification, need for ventilator support, need of G.A, length of hospital stay and perioperative complications. Data was collected and analyzed.

Observations And Results:-

Average age of patient was 62 years. Sixty patients were operated for duodenal perforations, twenty for gastric perforations, six patients had ileal perforations and four patients had general peritonitis secondary to appendicular perforations [TABLE 1]. Almost all of our patients had co-morbidities most common being COPD (67.7%), hypertension (38.8%) and Diabetes Mellitus II(22.2%). 11% of the patients had pulmonary tuberculosis under treatment, multiple co morbidities were seen in 20% cases and one of our cases showed kyphoscoliosis with restrictive lung disease[Table 2]. Sixty patients were ASA IV and thirty were ASA III.

All the patients had been optimized pre operatively, no cardio respiratory complications were observed. Only three patients needed G.A due to prolonged surgery and were successfully extubated. None of our patients needed mechanical ventilation in post-op period. Four patients needed inotropic support. Nausea and vomiting were recorded in 36 patients and was treated with ondansetron 4mg. Bradycardia was noted in 20 patients and treated with atropine 0.5 mg. one of our patient developed myocardial infarction on fifth day and was thrombolized and discharged after 15 days. 3% of our patients needed blood transfusion because of anemia. Three patients in our study developed basal pneumonia and were treated with higher antibiotics and discharged after 10 days. None of our patients developed deep vein thrombosis, respiratory depression or renal failure. Overall mortality rate seen was zero [TABLE 3].

Table 1:- Patient Demographics.

Male patients	50 (N)
Female patients	40 (N)
Mean age (years)	62 years
ASA grade III	30
ASA grade IV	60
Duodenal perforation	60
Gastric perforation	20
Ileal perforation	06 (04- tubercular, 02-typhoid)
General peritonitis	04(gangrenous appendicitis with basal perforation)

Table 2:- Patient variables.

Variable	N	(%)
Comorbidity		
Hypertension	35	38.8%
DM II	20	22.2%
Pulmonary cox under treatment	10	11.1%
COPD	61	67.7%
Multiple co-morbidities	18	20%
Kyphoscoliosis (dorsalspine with restrictive lung disease)	01	01.1%
Intervertebral level		
L1-L2	60	66%
L3-L4	30	33%

Table 3:- Case Outcome.

Nausea and vomiting	36 (40%)
Bradycardia	20 (22.2%)
Inotropic support	04 (4.4%)
Blood transfusion requirement	03 (2.7%)
Conversion to G.A	03 (2.7%)
Need for mechanical ventilation	nil
Hospital stay mean	07 days
Complication	
MI	01 (1.1%)
Basal pneumonitis	03 (2.7%)
DVT	nil
Renal failure	nil
Respiratory depression	nil
Mortality	nil

Discussion:-

Our study has demonstrated and confirmed the parameters that spinal anesthesia is safe and cost effective alternative to general anesthesia for emergency laparotomies in high risk cases. Though not being physiologically benign, spinal anesthesia offers advantages of improved diaphragmatic function and chest compliance thus maintaining normal minute volume. It also decreases lung congestion by decreasing preload and afterload. Mortality and serious complications such as DVT, pulmonary embolism, myocardial infarction, transfusion requirement, pneumonias, aerosol generating risks to staff, respiratory depression and renal failure are reduced in cases done under spinal anesthesia.

The benefits of neuroaxial blockade are conferred by multifactorial mechanisms like altered coagulation, painless breathing and reduction in surgical stress response^[14]. Risks of pulmonary aspiration in cases of intraoperative vomiting is reduced by intact airway reflexes. Safety and effectiveness of S.A in emergency laparotomies in our study has stronger evidence in favour of its use. Adequate intraoperative analgesia and surgical relaxation is maintained to the satisfaction of surgeon. Invasive airway management and polypharmacy involved in G.A is reduced as well as potential post-op mechanical ventilation and prolonged level 2 and level 3 care required usually in such cases is almost nullified. Considering this and the fact that hard pressed/ lack of ventilatory support at some institutions may be taken care of by using spinal anesthesia for all cases of high risk emergency laparotomies.

Conclusion:-

Emergency laparotomy carries well recognized significant life threatening intra and post operative risks in patients with co-morbidities like COPD and higher ASA grades. Safety of S.A in such situations is well established and cannot be ignored so far as hospital stay and cost of ICU is concerned. Based on our observations we recommend S.A as suitable alternative to G.A in emergency laparotomies in resource constrained context. Skilled surgeons and

anesthetists can perform emergency laparotomies of high risk cases under S.A in absence of compromised modern ventilatory facilities and intensive critical care settings.

What the study adds to the existing knowledge? In present day Covid-19 scenario spinal anesthesia minimizes the aerosol generation, thus protecting the vulnerable healthcare personnel from any suspected sources, hence making S.A as suitable alternative to G.A in emergency laparotomies.

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Conflict of interest:

None declared

Ethical Approval:

This study was approved by the Institutional Ethics Committee

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