A Comparative study between inhalational anesthesia with sevoflurane and T.I.V.A with dexmetomedin and remifentanyl for morbidly obese patient in laparoscopic surgery for morbid obesity.

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Abstract

Aim: Anesthesia for morbidly obese patients is a challenge for every anesthesiologist. We aimed in this study to find a better way of anesthetizing such patients with multiple co-morbidities.

Method: Fifty morbidly obese patients, ASA I, planned to undergo laparoscopic gastric banding were randomly selected and distributed into two groups 25 patient each. Anesthesia was induced by fentanyl 1 mg/kg, propofol 1.5 mg/kg, rocuronium 0.9 mg/kg, anesthesia was maintained in the first group with sevoflurane along with O2 70% in 30% Air while the second group received dexmetomedin 7-10 mg/kg/h plus remifentanyl 6-9 mg/kg/h. All the following variables were recorded: blood pressure, heart rate and O2 sat at induction, intubation, during abdomen CO2 insufflation, at extubation and immediately at the arrival to the recovery room. Time from cessation of the anesthetics agent for both groups till extubation was measured, analgesic requirements during recovery stay were recorded according to visual analog score.

Results: Total intravenous anesthesia using remifentanyl and precedex in group II provided better hemodynamic stability indicated by average (105.9) blood pressure and average (80.5) heart rate, while for the inhalational anesthesia the average blood pressure and heart rate were (128.03), (99.3) respectively. And better analgesic effect (21.05%) of the patients needed analgesia in group 2 vs. (47.8%) in the group 1, while longer awakening time from anesthesia needed for group 2 (5.8 min) which vs. group 1 (3.5 min).

Conclusion: Total intravenous anesthesia using remifentanyl and dextrometomin is an ideal method to anesthetize a morbidly obese patient, as it provides hemodynamic stability and better analgesics effect.

INTRODUCTION:

Morbid obesity is becoming a universal health and economical problem due to the increasing number of the morbidly obese patient even in the developing countries, undoubtedly this dilemma makes a burden on the governments, patients and physicians.

It is estimated that ten percent of morbidly obese patients have severe respiratory impairment such as obesity hypoventilation syndrome, while over 50% have moderate or severe sleep apnea. Opioids can be associated with potentially pronounced respiratory depressant effects in patients with OSA. Therefore, this patient population could benefit from a drug that can produce analgesic effects without significant or long-lasting effects on respiratory function.
Laparoscopic surgery for morbidly obese patient is being carried out everyday under general anesthesia and no doubt that the traditional anesthesia with inhalational anesthesia for those patients carries many risks because smooth induction and attenuation the stress response to endotracheal intubation and abdomen gas insufflation and during the period of extubation and weaning of the ventilator is the main goal in anesthesia generally and in such patient specially, and this is difficult to achieve with the traditional inhalational anesthesia unless a large dose of opioid is used and this will make them under risk of developing postoperative respiratory depression which is common for those patients. 2. other goal is a smooth recovery from anesthesia without letting them to feel any pain or at least little pain and this again difficult to achieve with inhalational anesthesia for the mentioned reasons.

Dexmetomidine is a sedative α2 agonist drug introduced to the market after approved by the F.D.A in 1999 it has some desirable effects like decreasing the heart rate and moderate hypotension and rapid onset of action and rapid elimination. It is now well known that it has a good analgesic properties. 3. Recently precedex has been approved by the F.D.A to be used for morbidly obese patients. Remifentanyl which is an opioid agonist with a hypotensive effect and short duration of action and analgesia and it has been wildly for that properties. 4. Our idea of using both drugs came from our search for drugs that have rapid onset and offset of action, hypotensive effect, and that reduce the heart rate, in order to attenuate the stress response which is exaggerated in the over weight patient.

METHOD:
Approval of Hospital Human Ethics Committee was procured and an informed patient written consent was signed for each patient. Fifty morbidly obese, A.S.A class I, middle aged patients were randomly selected and distributed into two groups, both groups received 5mg of dormicuim intramuscularly and 5mg of morphine intravenously as premedication one hour before the planned operation.

Large bore i.v canulla”g18” was inserted to all patients, in the operation room patients laid on the operation table in a supine position. The following monitors were applied:- Spo2, E.C.G, N.I.B.P cuff and B.I.S to keep depth of anesthesia between 40-60. Anesthesia was induced for the two groups with fentanyl 1µg /kg, propofol 1-2 mg/kg, rocuronium 0.9mg/kg for rapid intubation, after 40 seconds intubation attempted using an endotracheal tube size 8 mm and i.p.p.v with the following setting T.V of 4-6 ml/kg, R.R
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of 10 was started, and peep of 5 also was added to reduce the risk of atelactasis post operatively.

Anesthesia in the first group was maintained with sevoflurane 1.5 V% in addition to O2 70% in Air30%.

The second group received infusion of precedex 5-7 µg /kg/hr and remifentanil 6-9 µg /kg/hr in addition to O2 70%in Air 30%.

at the end of the surgery paracitamole 1g i.v and lornoxicam 16 mg i.v both over 10 min were given to all patients in both groups .all anesthetics were stopped at the end of the surgery and atropine 20 µg /kg with neostigmine 35 µg/kg were given in one syringe to reverse the muscle relaxant. Patient were awakened up and transferred to the recovery room. All patients received 2000 ml of lactated ringer to eliminate the effect of hypovolemia on the heamodynamic stability.

All the surgeries were carried out by the same surgeon and the same anesthetist.

MEASUREMENTS:

All the following parameters were recorded B.P, SPO2, and HR at induction, intubation, during CO2 isufflation of the abdomen, extubation and in the recovery room immediately upon arrival .the time from cessation of the anesthetics agents till extubation was measured, analgesic requirement in the recovery room were assessed according to visual analog score from 0-10, where 0 means no pain till 10 which is the worst pain .

T test was used to analyze the data and p value less than 0.05 was significant. And Chi-Square Statistics Section

RESULTS

All the patients successfully recovered from the surgery and so the analysis could be carried out on the numbers of patients originally allocated. Table 1. Shows a summary of the quantitative assessment made on these patients during their operations.

Two groups of morbidly obese patients were studied: table 1-1

<table>
<thead>
<tr>
<th>Patients number</th>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/years</td>
<td>35.2</td>
<td>35</td>
</tr>
<tr>
<td>Gender M/F</td>
<td>12:13</td>
<td>11:14</td>
</tr>
<tr>
<td>B.M.I</td>
<td>41.8</td>
<td>43.7</td>
</tr>
</tbody>
</table>

All surgeries took an average time of (60_+ 10 minutes).

At intubation significant difference in the vitals signs was observed in the first group were the mean deviation for the blood pressure was (115.5) and for the heart rate it was (104.2) while minimal change was observed in the H.R and blood pressure in the second group were the mean deviation from the induction values.
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for the blood pressure was (103.8) and for the heart rate it was (82.4).

During CO2 abdominal insufflations again in the first group there was big deference in the vitals signs from the induction values were the mean deviation for the blood pressure was (128) and for the heart rate it was (108.4) while minimal change from the induction values was seen in the heart rate and blood pressure in the second group were the mean deviation for the blood pressure was (98.6) and for the heart rate was (85.6).

At extubation in the first group significant change was observed in blood pressure and the heart rate were the mean deviation for the heart rate was (81.4) and for the blood pressure it was (112.8), while in the second group the vital signs remained stable were the mean deviation for the blood pressure was (145.9) and for the heart rate it was (109.9).

In the recovery room the patient in the first group still have a high blood pressure and heart rate compared with the induction values were the mean deviation for the blood pressure was (122.7) and for the heart rate (74.6), while the second group could keep there blood pressure and heart rate within the induction values were the mean deviation for the blood pressure was (108.4) and for the heart rate it was (72.5).

Regarding the time from discontinuing the anesthetic agent till extubation it was shorter in the inhalational anesthesia group (3.5 minutes), while in the T.I.V.A group was (5.8 minutes).

No significant difference between the two groups was seen regarding the O2 saturation all through the operation were the mean deviation in the first group at intubation was (100), during CO2 insufflation was (99.4) and at extubation was (98.5) and in the recovery room it was (98.1). While in the second group the mean deviation at intubation was (99.9), and during CO2 insufflation was (99.8), and at extubation it was (99.5) and in the recovery room it was (99.3).

There was significant deference in the pain score registered immediately in the recovery room and consequently the analgesic requirements of the patient where fewer patients in the second group asked for analgesic drugs (21.05%) While in the first group more patients asked for analgesics (47.8%).
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DISCUSSION:

Anesthesia for morbidly obese patients is a challenge to every anesthetist 5-7, our idea for this study came from our search for an anesthetic method that combines rapid onset and short duration of action with some residual analgesia to use it in this type of surgery which is laparoscopic surgery for morbid obesity, from the statistics shown above,

During period of intubation which is very stressful in such group of patient, because the incidence of difficult intubation and multiple attempts for intubation is common 8-11, inhalational anesthesia did not provide cardiovascular stability like the intravenous anesthesia and this can be attributed to the hypotensive effect of remifentanyl and dex, and there effect in reducing the blood pressure and the heart rate.

During the period of CO2 abdominal insufflation which is characterized by an increase in the heart rate and blood pressure which is due to maybe some absorbed CO2 in the circulation and its effect on stimulation of the sympathetic system ,and due to the effect of positioning of the patient during band placement 13,inhalational anesthesia didn’t provide cardiovascular stability to the inhalational group At extubation; were many effort has been made in the history of anesthesia to pass this period smoothly the advantages of total i.v anesthesia were great, we could extubate the patients very smoothly regarding there vital signs and there consciousness the patients could open there eyes and respond to the commands were the endotracheal tube still in place without coughing which was like magic in anesthesia as we believe, and this is even can be applied in other fields of anesthesia as we think. Some patients even were able to move there heavy bodies from the operating table to there bed.

In the recovery room the effect of T.I.VA .with precedex and ultiva on hemodynamic stability continues to prove to be very efficient, were the patients still have more stable heart rat and blood pressure in the second group and this because the residual effect of dexmetomedine on hemodynamic stability and its residual analgesic effect as shown below.

most of the patients after surgery and during the recovery stay recorded low pain scores measured by visual analog score and this indicated by there analgesic requirement for the both groups and this is attributed to the residual analgesic effect of Dexmetomidine mainly because the same analgesia were given to all patients
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Hofer, MD*, Juraj Sprung, MD PhD*, Michael G. Sarr, MD and Denise J. Wedel, MD)12 precedex proved to have opiod sparing effect in morbidly obese patient

Finally, it is worthy to mention that spite of all the benefits of total intra venous anesthesia used her we had one case of awareness in the second group even B.I.S score were kept between 50 and 60 the patient could recall all the intra operative events.

In conclusion: total intravenous anesthesia using dexmetomidine and remifentanil is a good method to anesthetize morbidly obese patients since it provides great hemodynamic stability all through the operation and good residual analgesic effect.

References
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