Comparison of Different Anaesthetic Techniques for High-dose-rate Intracavitory Radiotherapy for Carcinoma Cervix

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Citation

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Abstract

Purpose- To compare the three different anaesthetic techniques for high dose rate intracavitory radiotherapy in patients of carcinoma cervix .We compare the quality of analgesia, side effects .

Methods- After approval from the ethical committee of our institution and informed consent from the patients with ASAI/II in the age group of 25-70yrs were included. 35 patients underwent 105 sessions were divided into three groups .In group A anaesthetic technique was sub-arachnoid block, in group B general anaesthesia with LMA and in group C general anaesthesia with face mask. Postoperatively pain was assessed by visual analogue scale (VAS) , motor block by Bromage scale, sedation by Ramsay sedation score (RSS) , Postoperative nausea & vomiting by nausea vomiting score. Postoperative analgesia given according to VAS.

Results- In 10 patients (1 in group A, 3 in group B,6 in group C) patients developed PONV with score of more than 2. Sedation was observed in which RSS was 3 (2 in groupB,1 in group C).VAS was <4 in 9 cases in group A,12 in group B,14 in group C while VAS was 4-6 none in group A,12 in group B,13 in group C and VAS >6 none in group A,2 in group B,4 in group C.

Conclusion -We concluded that anaesthesia related complications are higher under general anaesthesia as compared to regional anaesthesia. Regional anaesthesia provides better postoperative analgesia as compared to general anaesthesia in patients under going high dose rate intracavitory radiotherapy for carcinoma cervix.

INTRODUCTION

Radiotherapy is an important and potentially curative treatment for malignancies of the cervix. Successful treatment requires a combination of external beam X-Ray and brachytherapy. [1]

There are various anaesthetic techniques described for high-dose –rate (HDR) intracavitory radiotherapy (ICRT) for carcinoma cervix i.e. conscious sedation, local infiltration, regional anaesthesia ,general anaesthesia etc.An anesthesiologist plays a vital role during brachytherapy. American Society of Anesthesiologists (ASA) has recommended that all patients receiving conscious sedation be monitored by a designated individual who is primarily responsible for administering sedative and analgesic drugs and monitoring the patient's vital sign [11] .Some radiotherapist recommended that in order to minimize the acute complications there should be an anaesthesiologist involved to monitor conscious sedation for high risk patients [9] . Many of the patients are medically unfit for surgery due to distant metastasis and co-morbid conditions i.e. hypertension, diabetes, ischemic heart disease etc . [1] The radioactive sources are potentially very painful and can remain in situ for several days. [1] The use of appropriate analgesic technique can reduce these treatments from being an ordeal to slightly unpleasant. [2]

High Dose Rate Intracavitory Radiotherapy involves the insertion of brachytherapy applicators into the uterus and vagina under anaesthesia or analgesia. Remote after loading applicators are used nowadays, wherein hollow tubes are inserted which are connected later to the radioactive source.Vaginal packing done so that the applicator stays in situ.The number of insertion varies from 2-6.The protocol followed at our institution is 3 sessions, 1 week apart. [3]

An individual session involves insertion of applicators in the

operation theatre.Following this, simulation films are taken for radiotherapy planning and finally the patients are treated on the HDR machine. The overall time taken for each patient is 1 $^{1/2}$ -2 hours, following which the vaginal packs and applicators are removed..

In the present study we compared the three different anaesthetic techniques for HDR- ICRT (i.e.-sub-arachnoid block, general anaesthesia with laryngeal mask airway, general anaesthesia with face mask) in view of quality of analgesia and side effects. [4]

As there is no previous study regarding the suitability of anaesthetic technique for HDR – ICRT for carcinoma cervix is available, there is need for an ideal anaesthetic technique for HDR- ICRT with great patient satisfaction yet lesser side effects for a long time.

METHODS

The present study conducted in the department of Anaesthesiology and Critical care, IRCH, AIIMS, New Delhi from October 2005 to February 2006.

After approval from the ethical committee of our institution and informed consent from the patient we included 35 patients of carcinoma cervix who underwent 105 sessions of high –dose –rate ICRT. We included patient with ASAI/II in the age group of 25-70 yrs for the present study. All were scheduled to undergo high-dose-rate intracavitory radiotherapy for carcinoma cervix.

Exclusion criteria were patient's refusal, severe systemic disorder, raised intracranial pressure, low backache, patient undergoing treatment for chronic pain, coagulopathy, allergy to drugs used, psychiatric illness.

After thorough pre anaesthetic checkup patients undergoing HDR ICRT were taken, total 35 patients were divided into three different groups; in Group A –anaesthetic technique was Subarachnoid block, in Group B –General Anaesthesia with Laryngeal Mask airway, Group C –General Anaesthesia with face mask.In group A under all aseptic precautions lumber puncture was carried out in either L3-4 or L4-5 interspace by using 25 G spinal needle. SAB was given by bupivacaine 0.5% heavy 2 ml after confirmation of free flow of CSF.After 10 min maximum sensory level of block was assessed and lithotomy position for the procedure was given. In group B and group C ; induction was done with intravenous fentanyl 2µg/kg,intravenous propofol 2-2.5mg/kg and isoflurane 0.5-1% with oxygen: nitrous oxide 50:50 and maintained on oxygen: nitrous oxide 40:60,isoflurane 0.5-1% on spontaneous respiration using laryngeal mask airway in group B,while in group C patients were maintained on spontaneous respiration using face mask. Intraoperative monitoring was done by observing heart rate, non invasive blood pressure, $Sp0_2$ throughout the procedure. Postoperatively pain was assessed by visual analogue scale VAS_5 (10 cm scale in which 0=no pain,10=maximum pain), motor block was assessed by Bromage scale (1=no block, 2=partial block, 3=almost complete block, 4=complete block), sedation was assessed by Ramsay sedation score (RSS) (1=Anxious,agitated,restless, 2=cooperative,oriented,tranquil, 3=Responds to commands only, 4=Asleep, brisk response to stimulus, 5=Asleep, sluggish response to stimulus, 6=Unarousable), Postoperative nausea & vomiting was assessed by nausea vomiting score(0=No nausea ,1=Nausea, 2=Retching, 3=Vomiting) 2 hourly for 12 hours. Postoperative analgesia given according to VAS_5 (<4 Diclofenac, 4-6 Tramadol, > 6 Fentanyl or morphine).

Statistical Method: The descriptions of continuous variables are shown as mean and standard deviation. Categorical covariates are listed as proportion and in numbers. Fisher's exact test was used to find out the association of groups with various categorical variables. One way analysis of variance was used to compare the mean values of heart rate, systolic blood pressure and diastolic blood pressure among the different groups. P-values less than 5% level of significance were considered as significant results.

RESULTS

We studied 105 patients of HDR-ICRT for carcinoma cervix. All patients were under age group of 25-70years (Table 1).The duration of procedure was in the range of 10-50mins, most of the sessions were completed in 30mins.

In our study we monitored intra-operative heart rate, non invasive blood pressure, spo_2.There were no statistical difference in 3 groups.

Figure 1

Table 1: Demography & Hemodynamics

	Group A	Group B	Group C	P value
Age(years) Mean± SD	52.31± 10.39	51.46± 9.79	52.00 ±10.52	0.939
Mean weight(kg)	47.89±10.24	48.60±9.63	51.71± 10.88	0.257
Heart Rate/minute Mean± SD	85.20±13.71	84.86±11.24	85.43±12.04	0.981
*SBP(mmHg) Mean± SD	132.34±14.83	129.14±16.90	128.40±13.24	0.511
**DBP(mmHg) Mean± SD	84.66±12.40	80.09±8.30	81.46±8.49	0.146

*Systolic blood pressure,

** Diastolic blood pressure

In group A 9 patients required analgesia after 2-4 hours postoperatively and were given intramuscular Diclofenac sodium 75 mg ,while 12 patients in group B and 14 patients in group C required intramuscular Diclofenac sodium 75 mg(VAS <4). In group B 10 patients required Tramadol (VAS 4-6) and 2 patients required Fentanyl (VAS >6).While in group C 9 patients required Tramadol (VAS 4-6), and 4 patients required Fentanyl (VAS >6), while no patient in group A required neither tramadol nor fentanyl,The comparison between group A and B and between group A and C is significant but comparison between group B and C is not significant. (Table 2).

Figure 2

Table 2: Description of pain scores in various groups.

Pain score *(VAS) and rescue analgesics	Group A	Group B	Group C	P value
VAS (0-4),Diclofenac	09	12	14	0.038
VAS (4-6),Tramadol	0	12	13	0.038
VAS (6-10), Fentanyl	0	02	04	0.038

*Visual analogue scale

One patient developed laryngospasm in group B which was treated without sequalae.No life threatening complications occurred in any session.

In 10 patients (1 in group A, 3 in group B,6 in group C which were stastically not significant) patients developed PONV with the score of more than 2.Incidence of PONV was more in patients in which duration of procedure was more than 30 mins.Sedation was observed in 3 patients in which RSS was 3 (2 in groupB,1 in group C which were stastically not significant) (Table:3).

Hypotension was observed in 2 patients in group A and treated without any sequalae with the help of crystalloids. In 2 patients post dural puncture headache was developed and treated with analgesics and crystalloids infusion.(Table 3).

Technical problems while giving subarachnoid block were observed in 3 patients. These include multiple puncture attempts (more than 2 attempts).

Figure 3

Table 3: Description of side effects in various groups

Side effects	Group A	Group B	Group C	P value
*PONV	1	3	6	0.151
Rescue anti emetic	0	3	6	0.477
Sedation	0	2	1	1.000
Hypotension	2	0	0	
**PDPH	2	0	0	

*Post operative nausea and vomiting

** Post dural puncture headache

DISCUSSION

Radiotherapy is definitive and curative treatment for malignancies of cervix. Ideal treatment requires a combination of external beam x-ray and brachytherapy. [3]

Intracavitory radiotherapy for carcinoma cervix revolutionized the management for cervical cancer. There is manually insertion of radiation isotopes applicator into the uterus, cervix and vagina under anaesthesia or analgesia. [3]

Various techniques of anaesthesia have been described for intracavitory radiotherapy for cervical cancer. Each technique has its own advantage and some disadvantages also. [4]

In the present study we compared the different anesthetic

techniques for intracavitory radiotherapy for cervical cancer. We observed the different side effects of different anaesthetic techniques and analgesic requirement.

Radiation oncologist are using local infiltration on the cervix and vagina , Para cervical block and conscious sedation. American Society of Anesthesiologists (ASA) has recommended that all patients receiving conscious sedation be monitored by a designated individual who is primarily responsible for administering sedative and analgesic drugs and monitoring the patient's vital sign [11]. Petereit DG et al conducted a study to determine the 30-day morbidity and mortality rates for patients undergoing high-dose-rate (HDR) brachytherapy, and to assess risk factors which may predict for these potentially life-threatening complications30 days m and they recommended that in order to minimize the acute complications there should be an anaesthesiologist involved to monitor conscious sedation for high risk patients [9] During conscious sedation an anesthesiologist with continuous monitoring should present. [1,9,11]

In a retrospective study by Lam and Colleagues in 18 patients concluded that general anaesthesia is associated with higher rate of anaesthesia related complications than conscious sedation or local anaesthesia.In another study by Lim KH et al, total 13 complications reported, out of which 12 related to general anaesthesia, and one related to regional anaesthesia. [4] We also observed that the prevalence of complications with general anaesthesia was 9 out of 70 patients, and with regional anaesthesia 5 out of 35 patients.

There is no study regarding postoperative pain assessment, requirement of rescue analgesics, incidence of postoperative nausea and vomiting and requirement of rescue antiemetics in intracavitory radiotherapy for carcinoma cervix till date. [6]

Till now there is very little information about regional anaesthesia in brachytherapy. There is a sole review of analgesia for pelvic brachytherapy only. M.D Smith and colleagues observed that 26% of patients experienced severe uterine pain after insertion of applicators which were relieved by nitrous oxide, opioids and NSAIDS. [1]

In our study, 24.7% cases experienced mild pain, 18.1% cases experienced moderate pain and 5.7% cases experienced severe pain and treated with injectable diclofenac, tramadol and fentanyl respectively.

The cause of pain is presence of applicator rods in the body of uterus which stimulates sympathetic autonomic afferents which enters the spinal cords at T10-T11 level. This produces central lower abdominal pain of the cramping nature associated with nausea and vomiting. Distension of cervix and vagina stimulates parasympathetic autonomic afferents from the pelvic splanchnic nerves of S2-4 to cause lower back pain. Vaginal packing stimulates somatic afferent via the pudendal nerves of S2-4. Urinary catheter and applicator rods present until treatment. All these stimuli are worsened by patient's movement, this occurs on transfer from OT table to transfer trolley and from trolley to bed. [1]

Beneath and colleagues performed a retrospective analysis of records of 1622 anaesthetic procedures in 952 patients, they observed incidence of hypotension and bradycardia in about 10% patients with regional anaesthesia. [6] In our study incidence of hypotension was 5.7% under spinal anaesthesia. No patient developed bradycardia with spinal anaesthesia. This low incidence of complication is probably because we kept level of block not higher than T6 and adequate preloading of the patients with 500 ml of crystalloids. In our study only 1.9% patients developed post dural puncture head ache, while in literature incidence was 2-40%. [8] The incidence of headache after spinal anaesthesia varies greately between studies.The incidence is 40% with a 20 G needle; 25% with a 25 G needle;2-10% with a 26 G needle, and less than 2% with a 29 G needle. [8]

CONCLUSION

We conclude that anaesthesia related complications are higher under general anaesthesia as compared to regional anaesthesia, and regional anaesthesia provides better postoperative analgesia as compared to general anaesthesia in patients under going high-dose-rate intracavitory radiotherapy for carcinoma cervix. These patients has to undergo 3 sessions at weekly interval, safety of regional anaesthesia has to be justified by a study containing large number of patients.

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