
Clinical results of combined epidural and general anesthesia procedure in radical prostatectomy management

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Objectives: Improvement of radical prostatectomy surgical technique remains an objective for urological practice. The aim of this study was to evaluate the potential benefit of intra and postoperative epidural versus general anesthesia alone.

Material and methods: The authors retrospectively analyzed 62 consecutive cases of patients who underwent radical retropubic prostatectomy over a 2-year period. The mean age was 65.5 years (51-75). Two groups were selected: group I = 19 patients, who received epidural anesthesia in association with general anesthesia and group II = 43 patients with general anesthesia alone. Both groups were similar for ASA score, Body Mass Index, prostate volume, tumor stage and Gleason score. Evaluation criteria were operative time, blood loss, postoperative pain (analgesics required) and length of

hospital stay. Mono and multifactorial statistical analysis were performed.

Results: Operative time in group I was 189 mn versus 218 mn for group II ($p = 0.01$). Significant difference was found independent of surgical experience. Moreover, significant blood loss ($p = 0.002$) was observed: 971 ml in group I versus 1840 ml in group II. Also, less blood was transfused during surgery in group I: 0.84 blood units transfused versus 2.60 blood units in group II ($p = 0.007$). In both groups, hematocrit level remained stable during surgery. As regards postoperative pain, an improvement in required analgesic level was noted in group I during the initial 48 hours ($p = 0.001$ for day 1; $p = 0.032$ for day 2). Finally, mean hospital stay was only 9.3 days in group I and 12.4 days in group II ($p = 0.005$).

Conclusion: Our study suggests that improved results can be obtained when epidural anesthesia is associated with general anesthesia in radical retropubic prostatectomy intra and postoperative management, with a significant reduction in morbidity.

Key Words: epidural anesthesia, radical prostatectomy, blood loss, postoperative pain

Introduction

The past-several years has seen an increase in the frequency of prostate cancer, which currently represents the second cause of mortality for men. The

use of PSA screening in routine clinical practice has significantly modified patient care management. In most cases, prostate cancer can now be diagnosed at an earlier pathological stage.¹⁻³ Radical prostatectomy is considered the gold-standard for surgical treatment in patients with localized prostate cancer.^{4,5} Nevertheless, this approach may be responsible for significant blood loss, acute postoperative pain as well as extended hospital stay.⁶

We report our experience, using two different anesthetic procedures: general anesthesia or

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combined general and epidural anesthesia. In both groups, surgery was performed with a lumbar hyperextension installation and hypotension control during the procedure. The aim of the present study was to evaluate the potential benefit of intra and postoperative epidural versus general anesthesia alone in the treatment of acute postoperative pain.

Material and methods

Population characteristics

Sixty-two patients were included in a consecutive retrospective study between January 1997 and March 1999. The average age was 65.5 years (range 51 - 75 years) with a mean ASA score of 1.2 (range 1 - 3) and patient Body Mass Index of 2.28 (range 1.72 - 2.84). Localized prostate cancer was found in all patients. According to T.N.M. classification, tumor distribution was: 8 T1b, 19 T1c, 35 T2 and N0, M0. The average Gleason score was 6.2 (range 4 - 9).

Surgical procedure

Radical retropubic prostatectomy was performed through a lower midline abdominal incision, as previously described.^{4,5} All surgical procedures were carried out by the same surgeon expert in urological oncology (CP). Frequency of radical prostatectomy was lower in 1997-1998 (35 cases per year) than currently, however it could be considered a representative number of cases observed in French urological centers during that period. Lumbar hyperextension installation was routinely used for optimal access of the venous Santorini plexus and prostate apex. This approach was tested prior to anesthetic procedure. All patients had thigh-length compression stockings applied to both legs prior to anesthesia induction. Moreover, perioperative hypotension control using isoflurane was proposed in order to reduce blood loss. Low pressure level (range 70 to 90 mm Hg) was then maintained by peridural anesthesia and surgical patient position, which was controlled during the surgical procedure.

Anesthetic protocol

Peridural anesthesia was performed in 19 patients combined with general anesthesia and in 43 with general anesthesia alone. In our department peridural anesthesia is never used alone, not only because of the length of surgical time but also due to the uncomfortable position of the patient. The related contraindications still remains a subject of debate Table 1. Prior to induction of anesthesia, an epidural catheter was inserted at the L3 to L4 or L4 to L5

TABLE 1. List of anesthetic contra-indications to techniques used in this study

Lumbar hyper extension position contra-indications
severe sciatica
spine pathology
Controlled arteriel hypotension contra-indications
coronary insufficiency
hepatic insufficiency
cerebral circulatory insuffisance
Epidural anesthesia contra-indications
hemogram anomaly
laminectomy
valvular aortic stenosis
General or local infection in the target ponction

interspace. Either ropivacaine 0.75% or bupivacaine 0.5% anesthetic drugs were administered. Peroperative continuous epidural infusion was not possible because of lumbar hyperextension installation. However, following surgery and prior to catheter removal, a repeated epidural injection using marcaine 0.25% or ropivacaine 0.20% was performed in order to reduce postoperative pain.

After the general anesthesia, all patients were intubated and pressure support ventilation was administred. Anesthesia was induced using combined: fentanyl (1-2 µg/kg), sodium thiopenthal (4-6 mg/kg) and vecuronium bromide. General anesthesia was maintained with isoflurane (end-tidal concentrations lower than 0.5%), morphinic and curare.

Peri and postoperative management

Perioperative evaluation criteria in the present study were: the surgery time which not only depended on individual surgical experience, but also estimated blood loss (ml) calculated using the weight of surgical sponges, the intraoperative fluid suction volume and the average of two hematocrit measurements. The quantity of blood transfused and Ringer's solution infused were also carefully monitored. During the postoperative period, the main criteria was acute patient pain, evaluated by a visual analog scale, quantity of analgesic required and length of hospital stay.

Statistical analysis

The two anesthetic groups were compared using a one-factor analysis of variance for continuous variables previously defined. The Mann and Whitney test was used for the analysis of qualitative variables such as surgical margins, lymphadenectomy results

TABLE 2. Patients and prostate cancer characteristics

	G Mean	A SD	GA+ Mean	EA SD	p
Age (year)	65.3	6.51	66	5	NS
Weight (kg)	77.5	10.89	74.1	7.81	NS
Height (cm)	173.6	7.56	172.3	6.44	NS
BMI (cm/kg)	2.25	0.24	2.34	0.21	NS
ASA score (mean)	1.83	0.72	1.47	0.61	NS
Prostate weight (gr)	49.25	26.01	54.42	20.91	NS
Gleason score (2-10)	6.27	1.33	6.42	1.3	NS

TABLE 3. Intra and postoperative evaluation of blood loss and blood units required

	G Average	A SD	GA+ Average	EA SD	p
Blood loss (ml)	1840	1456	971	527	0,002
Vascular filling	3535	1216	3210	804	NS
Blood units (number)	2.6	0.43	0.84	0.32	0.007
P.F.C. (number)	0.27	0.014	0	0	NS
Preop. hematocrit (%)	42	3.23	42.4	3.37	NS
Postop. hematocrit (%)	32.3	3.95	30.6	4.43	NS

and surgical experience. Simple linear regression and one-way analysis of variance were used to identify univariate predictors of peroperative blood loss and postoperative pain. Multiple linear regression with backward elimination was used to identify independent predictors of bleeding. For all analyses, $p < 0.05$ was considered significant.

Results

Patients were divided into two groups: group I = 19 patients, who received epidural anesthesia in association with general anesthesia and group II = 43 patients with general anesthesia alone. Using monofactorial analysis, no significant difference was observed as regards patient characteristics (age, weight, MBI, ASA score) and prostate cancer parameters (clinical stage, Gleason score) Table 2.

Reduction in surgical time was related not only to surgical experience, but also to the anesthetic procedure used. In fact, we observed a significant difference when general anesthesia was combined with epidural anesthesia: 189 mn for group I versus 218 mn for group II ($p = 0.01$). Moreover, significant blood loss ($p = 0.002$) was observed: 971 ml in group I versus 1840 ml in group II. Intraoperative low blood pressure level was more frequently obtained by the

combination of general with epidural anesthesia. Also, less blood was transfused during surgery ($p = 0.007$) in group I : 0.84 blood units transfused versus 2.60 blood units in group II Table 3. In both groups, hematocrit level remained stable during the surgical procedure. Finally, blood loss was completely independent of surgeon experience, BMI and ASA score or poor prognostic factors for prostate cancer (tumor stage, Gleason score) Table 4.

As regards postoperative pain, evaluated three times a day by using a visual analog scale, an

TABLE 4. Prostate cancer prognostic factors multivariate analysis

	Blood loss	SD	p
Junior surgeon	- 90.4	429.8	0.83
GA+EA	474	210.5	0.041
ASA Score	- 18	266.08	0.94
Gleason grade	- 27	140.78	0.84
Histological surgical margin	- 154	361.8	0.67
Blood units used	1172	347.6	0.0014
Prostate weight	- 3.13	6.86	0.64
	V.M.F		

improvement in required analgesic level was noted in group I during the initial 48 hours ($p = 0.001$ for day 1; $p = 0.032$ for day 2) Figure 1. Finally, mean hospital stay was only 9.3 days in group I and 12.4 days in group II ($p = 0.005$).

Discussion

Intraoperative blood loss during radical prostatectomy has been attributed to multiple clinical variables including: patient age, Body Mass Index and ASA score, tumor stage and Gleason score, surgeon experience and anatomic differences between patients.^{6,7} In most series, peroperative blood loss evaluation is usually based on intraoperative fluid suction volume, but moistened compress and operative fields are not taken in account. Moreover, no strict guidelines concerning blood product transfusion according to hematocrite are well established. Both epidural and general anesthesia can be routinely and safely proposed in patients undergoing radical prostatectomy. Some studies have suggested that epidural anesthesia was associated with less peroperative morbidity and post operative pain.⁸⁻¹² In an effort to minimize the confounding variables previously described, we attempted to assess the potential benefit of combined epidural and general anesthesia on blood loss and postoperative pain management.

Our results are in agreement with these reported in the literature in terms of intraoperative hemorrhage.^{7,13,14} However, the absence of different clinical variables may explain the difficulty in comparing these series. In our experience, physical criteria including patient age, prostate volume, ASA score, Body Mass Index were comparable in both groups. Therefore, final tumor stage and Gleason score, lymphadenectomy results and histological surgical margin were found to be similar. A reduction in perioperative blood loss with a subsequent decrease in the need for blood product transfusion during radical prostatectomy is necessary. In order to more accurately evaluate peroperative blood loss, some authors have suggested to weigh all the surgical sponges before and after surgery.^{6,7} This procedure is often laborious and above all not well reproducible. Transfusion decisions are made intraoperatively by the anesthesia team. Therefore Peters et al proposed to analyze blood product replacement rather than intraoperative blood loss alone.⁶ However, the hematocrite value varies not only according to peroperative hemorrhage, but also due to fluid replacement and vasopressor administration, which can result in hemoglobin dilution. The results of our retrospective study suggest the advantage of using

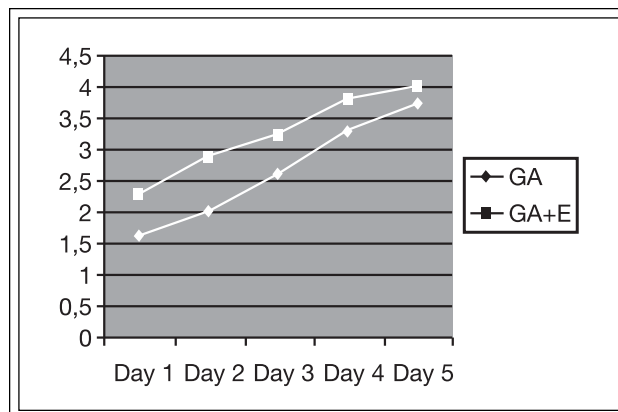


Figure 1. Postoperative pain evaluation: combined epidural and general anesthesia versus general anesthesia alone.

epidural combined with the general anesthesia. We also observed a significant difference in blood loss ($p = 0.002$) and transfusion during surgery ($p = 0.007$). The quality and persistence of hypotension during epidural anesthesia, in association with lumbar hyperextension installation, was furthermore a significant contributing factor in reducing blood loss. These results are in agreement with previous studies that reported a correlation between blood pressure and surgical bleeding during epidural anesthesia.¹³⁻¹⁵ However, other investigators have suggested that anesthetic agents (i.e. isoflurane) and positive pressure ventilation may explain an increase in blood loss during general anesthesia.^{7,16}

Epidural analgesia using local anesthetics or opioids, either alone or in combination, is commonly used for postoperative pain management.¹⁷⁻¹⁹ Shir et al reported that postoperative morbidity following radical prostatectomy is more likely dependent on factors such as early ambulation, use of compression stockings and the technique of postoperative analgesia rather than the type of anesthesia.^{8,10} In our experience, we repeated epidural injection using marcaine or ropivacaine following surgery and prior to catheter removal. The evaluation of postoperative pain in the epidural combined general anesthesia group showed a significant decrease in the required analgesic level during the initial 48 hours, as previously published.^{20,21} In fact, to our knowledge no guidelines have been defined to evaluate EVA score in relation to antalgic administration time. Also, in our experience EVA score should be routinely combined with the patient's complaint reported in the ward files reported as well as the posology required. Moreover, we previously reported that the mean hospital stay was shorter when epidural anesthesia was

associated.²² The results of our study are historically interesting, even though currently length of hospitalization has been greatly reduced (i.e. less than 4 days). In fact, we reported in 1997-1998 a mean hospital stay of 9 days, not only due to French care management, but also to practice of extended urinary catheter duration. Today, these parameters are closer to those observed in North America. Furthermore, we feel that the combination of epidural and general anesthesia in radical prostatectomy management may directly contribute to reduction in blood loss as well as patient return to daily activities.

Several of the reported series have been limited by a lack of proper randomization, the absence of suitable control groups and a low statistical power. The main limitation of the present retrospective study remains the absence of randomization in the anesthetic protocol. In contrast, our two groups of patients were strongly homogenous as regards prostate cancer parameters and clinical patient status. Using multiple linear regression in the statistical analysis, we demonstrated that blood loss was completely independent of surgeon experience, BMI and ASA score, prostate cancer poor prognostic factors.

Conclusion

In this retrospective study, the authors reported improved results on intraoperative blood loss when epidural anesthesia is associated with general anesthesia in radical retropubic prostatectomy. The quality and persistence of epidural hypotension appeared to be a significant contributing factor in intraoperative hemorrhage. Moreover, blood loss was completely independent of surgeon experience, patient parameters and prostate cancer poor prognosis factors. Therefore, we observed a significant improvement in required analgesic level during the postoperative management with epidural combined general anesthesia. Finally, the mean hospital stay was also reduced for these patients. □

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