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Case Report

Anesthetic Management of a Parturient with a History of Primary Spinal Malignant Melanoma

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2. Key words

Regional anesthesia; Neuraxial blocks; Obstetric anesthesia; Primary spinal malignant melanomas

1. Abstract

1.1. Background: Primary CNS malignant melanomas are quite rare as they account for 1% of all CNS tumors. The potential presence of spinal cord malignancies is worrisome when considering neuraxial techniques due to possible complications. Additionally, a history of cervical spine surgery is a cause of concern in airway management, especially in an obstetric patient.

1.2. Case Presentation: A 30-year old patient with previous history of malignant melanoma of the cervical spine was referred for anesthetic evaluation prior to her repeat cesarean section. While neuraxial techniques are more commonly used in our department for cesarean delivery, we were mostly concerned about difficulty in airway management should we need to resort to it, as the patient had a history of previous primary spinal malignant melanoma in the cervical spine. We were also concerned about possible recurrence of the tumor in the lumbar region of the spine due to the rarity of the tumor and its unpredictable course.

1.3. Conclusions: A lumbar MRI is not a common preoperative anesthetic request however, adequate preoperative investigations are necessary especially when dealing with a rare medical condition. Neuraxial anesthesia may initially have seemed as the best option in this case but benefits must be weighed against the possible risks in the presence of a potential spinal malignancy

3. Introduction

While the third most common cause of central nervous system (CNS) tumors is metastatic malignant melanomas, primary malignant melanomas of the CNS are quite rare, as they account for only about 1% of all CNS tumors [1]. Consequently, the number of documented obstetric cases suffering from primary CNS tumors is quite low as well, where our literature review demonstrated only two cases [12, 14]. Anesthetic consideration had not been discussed in either of these cases. Additionally, a prior history of cervical surgery is always a cause of serious concern when managing the airway [2], especially in an obstetric patient, which may of course further complicate airway management. Also, when looking at the potential presence of malignancies affecting the spinal cord, there may be several possible complications [4, 5].

4. Case Description

A 30-year old patient scheduled for an elective repeat cesarean section at 37 weeks was referred for preoperative anesthetic assessment at 35 weeks of gestation, due to her significant past medical history. The patient had been diagnosed with an extramedullary, intradural malignant melanoma of the cervical spine, levels C1-C3 during her previous pregnancy three years ago. The condition had presented with neck pain and spasms, in addition to numbness and weakness of the upper limbs. Neurosurgery recommended conservative management during pregnancy till delivery, after which the tumor would be surgically removed followed by radiotherapy. However, the patient's pain became uncontrollable with development of lower limb weakness, requiring an unplanned cesarean section at 31 weeks of gestation, which was followed by emergency surgical debulking of the tumor and irradiation of the surgical bed. The patient rapidly improved after that and underwent regular follow-up MRIs. Her most recent cervical spine MRI when she was referred to us had been at 6 weeks of her following pregnancy. The radiologist noted nodular and plaque-like T1 hyperintense/T2 isointense foci growing along the anterior and posterior margins of the cord, and along the cervical nerve roots at C3-C4, which could not be ruled out as leptomeningeal malignancy in the absence of contrast-enhanced studies, which of course had not been done due to the patient's pregnancy. The management plan was to repeat the MRI in a few months' time, followed by an MRI with contrast after the baby was born and other further investigations, as needed. The repeat MRI, five months later showed similar findings. While there were no neurological deficits, the patient did start to complain of worsening lower back pain which, had been attributed to her advanced

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gestational age.

Our main concern when we met with the patient was the possibility that her airway may have been significantly affected by the previous surgical intervention and radiotherapy. On assessment, the patient did have mild limitation of her neck extension and limitation of lateral movement to the right, due to what she described as a sense of 'soreness' that had persisted since the surgical removal of the tumor. However, the patient's examination showed no other remarkable findings. We advised the patient that we would proceed for a spinal anesthetic for her cesarean section, as we wanted to avoid airway manipulation and because of the relative safety of neuraxial techniques in any parturient compared to General Anesthesia (GA). Additionally, the patient desired to be awake during this cesarean section rather than receive GA due to a rather traumatic experience during her previous surgical delivery, where she developed quadriplegia with respiratory distress and disturbed mentation shortly after extubation and transfer to Post Anesthesia care unit (PACU). This was due to the tumor hemorrhaging, which caused cord and foramen magnum compression, which required the emergency surgical intervention previously mentioned. We did explain to the patient however, that because of her cervical MRI findings indicating possible recurrence, it would be safer to have an MRI of the lumbar spine as well, to rule out any malignancy in that region before any neuraxial anesthetic interventions which may lead to further complications. The patient's MRI of the lumbar spine a week later unfortunately did show the presence of numerous nodular foci along the cauda equina roots, highly suggestive of leptomeningeal malignancy.

With high suspicion of malignancy now in place, her delivery plan was changed; her obstetric team decided to move the date of her delivery up as early as possible, in order to allow her to undergo the necessary investigation and/or treatment, as required. Additionally, we decided to reconsider our decision of spinal anesthesia and opted in favor of GA instead, because of our concern for inducing any complications by interfering in an area of the dura with a possible malignancy that was yet to be fully assessed.

General anesthesia was induced intravenously uneventfully, using 150 mg of propofol and 80 mg of succinylcholine for rapid sequence induction with airway management using a size 3 C-MAC blade. Intubation occurred smoothly and extubation was uneventful. It is worth noting however, that this 70 kg patient seemed to have higher than usual analgesic requirements. She received 250 mcg fentanyl and 10 mg of morphine in titrated doses, but still complained of severe uncontrollable pain and was additionally given a bilateral transversus abdominis plane block in PACU. The patient did not report being on any long-term opioid analgesics, which was confirmed by a chart review, so we attributed this increased demand for analgesia to the patient's anxiety because of her recent imaging findings. Imaging studies done after delivery did unfortunately support the initial impression of recurrence of malignancy, in addition to the detection of metastatic findings in her brain MRI.

5. Literature Review

A search for the terms "primary spinal cord malignant melanoma" was used in the *PubMed* search engine. Previous case reports and literature reviews were briefly reviewed and a total of 58 cases were found (Tables 1 & 2). Within our search, only two case reports in pregnant patients were found [12, 14]. None were found describing anesthetic management.

Literature Review

	Date	Publication	Author	Age & Gender	Tumor location
1	1906	Virchows Archiv	Hirschberg	67/f	Thoracic
2	1907	Frankfurter Zeitschrift für Pathologie	Boit	51/m	Thoracic
3	1907		Esser	32/m	Thoracic
4	1910	Virchows Archiv: Pathology Anatomy & Histopathology	Kawashima	26/f	Thoracic
5	1912	Hygeia	Lindbom	45/f	Cervical
6	1916	Zeitschrift für die gesamte Neurologie und Psychiatrie	Koelichen	25/m	Cervical
7	1926	Revue Neurologique	Ringertz	61/f	Thoracic
8	1926	Frankfurter Zeitschrift für Pathologie	Schmid	71/m	Thoracic
9	1929	Revue Neurologique	Bau-Prussak & Mackiewicz	29/m	Thoracolumbar
10	1930	Journal of American College of Surgeons	Bell	48/f	Cervicothoracic
11	1930	Pathalogica	De Blasi	71/f	Thoracic
12	1933	Journal belge de neurologie et de psychiatrie	Van Bogaert & Verbrugge	38/m	Thoracic
13	1938	The Journal of Nervous and Mental Disease	Schnitker & Ayer	49/f	Thoracic
14	1939	Mayo Clinic Proceedings	Da Costa & Love	55/f	Thoracic
15	1941	Revue Neurologique	Garcin et al.	52/m	Lumbosacral
16	1942	The Journal of Nervous and Mental Disease	Mackay & Hurteau	32/f	Cervical
17	1950	European Neurology	Castaner Vendrell et al.	52/f	Lumbar
18	1950	The Journal of Pathology and Bacteriology	Forbes & Maloney	57/m	Thoracic
19	1950	Revue Neurologique	Kissel et al.	25/f	Cervical
20	1951	Archives of Clinical Psychiatry (São Paulo)	De Assis & De Luccia	26/m	Lumbar
21	1951	Archives of neurology and psychiatry	King & Propst	47/m	Lumbar

22	1952	Guthrie Clinic Bulletin	King et al.	53/m	Lumbar
23	1953	Neurocirugia	Perino	40/m	Thoracic
24	1954	Médecine clinique et experimentale	Roca de Vinals et al.	50/f	Thoracolumbar
25	1957	The Journal of Pathology and Bacteriology	Gibson et al.	51/f	Thoracic
26	1960	Journal of Neurosurgery	Hirano & Carton	42/m	Thoracic
27	9/1961	Journal of Neurosurgery	Kiel et al.	33/f	Cervical: C4-C6
28	**5/1975**	**Neurological Surgery**	**Yamamoto et al.**	**27/f**	**Cervical: C2**
29	1984	Neurosurgery	Ozden et al.	15/f	Cervical
30	6/1986	Journal of Neuroradiology	Magni C et al.	64/m	Thoracic
31	1987	Journal of Neurosurgery	Larson et al.	73/m	Thoracic
32				63/m	Thoracic
33				67/f	Thoracic
34				57/f	Cervical
35				69/f	Thoracic
36	7/1989	Neurosurgery	Yamasaki T et al.	31/m	Thoracic: T6
37	3/1994	Neurosurgery	Skarli SO et al.	20/f	Cervical: C5-C6
38	4/1998	British Journal of Neurosurgery	François P et al.	62/m	Thoracic: T7-T9
39	10/1998	Journal of Neurosurgery	Salpietro FM et al.	62/m	Cervical: C3
40	2000	Acta Neurochirurgica	BidzinÂski J et al.	36/m	Cervical: C6-C7
41	11/2001	American Journal of Neuroradiology	Farrokh D et al.	80/f	Thoracic/Lumbar: T12-L1
42	12/2004	Journal of Neuroradiology	Blanchard N et al.	27/f	Lumbar: L5
43	10/2005	Clinical Neurology and Neurosurgery	Gueorgui K.Kounin et al.	41/f	Cervical: C2-C4
44	1/2007	British Journal of neurosurgery	Kanatas AN et al.	76/f	Cervical: C6-C7
45	4/2010	Spine	Lee CH et al.	39/m	Cervical: C1-C6
46	7/2010	European Spine Journal	Lee NK et al.	71/f	Cervical: C6-C7
47	9/2010	Neurology India	Vij M et al.	40/m	Cervical: C1-C2
48	6/2011	Journal of Clinical Oncology	Fuld AD et al.	62/m	Cervical: C2-C3
49	2/2012	Clinical Neurology & Neurosurgery	Ganiüsmen et al.	49/f	Lumbar L3
50	11/2012	Chinese Medical Journal	Yan L et al.	44/f	Lumbar
51	1/2013	The Canadian Journal of Neurological Sciences	Grahovac et al.	76/m	Thoracic: T12
52	1/2013	Journal of neurosurgery. Spine.	Chance A et al.	46/m	Thoracic: T12
53	4/2015	Journal of Cancer Metastasis & Treatment	Sharma A et al.	30/m	Cervical: C2-C3
54	1/2016	Spine Journal	Wang YB et al.	60/f	Thoracic: T1 and T3-T4
55	**4/2016**	**Oncology**	**Westergaard et al.**	**27/f**	**Cervical : C2-C3**
56	8/2017	International Journal of Clinical & Experimental medicine	Yang Y et al.	42/f	Lumbar: L5
57	7/2018	World Neurosurgery	Zhang M et al.	52/f	Thoracic: T10-T11

Abbreviations; f:female, m:male. Unattainable data was left blank. Cases in obstetric patients are in bold.

6. Discussion

A primary CNS tumor affecting the spinal cord is uncommon. The diagnosis of primary CNS tumors is done by using Hayward's criteria, the most important of which are; absence of melanoma in other systems outside the CNS and histopathological confirmation [3]. The most commonly affected spinal segments are either cervical or thoracic. The prognosis of primary CNS melanoma is relatively more favorable compared to malignant and metastatic cutaneous melanoma [8, 13]. This conclusion is based on very few cases. Due to its rarity, this type of melanoma's clinical course and prognosis are overall difficult to predict. That is why regular annual MRIs and follow-ups are recommended after treatment [].

As a result of this rarity and unpredictability, it was difficult to determine whether it was truly necessary to request a preoperative lumbar MRI for this patient, especially in the absence of any neurosurgical recommendations. We initially offered neuraxial anesthesia, so as to avoid any possible airway limitations due to surgical and irradiation history [11], in addition to patient's susceptibility to complications as an obstetric patient. We eventually preferred to err on the side of caution and make sure that we would not cause any neurological complications by our interventions, either.

There is a possibility of a variety of complications in the presence of an undiagnosed spinal cord malignancy. These include failure to achieve an adequate block and development of postoperative neurological deficits [9], as well as the possible risk of 'seeding' malignant cells further into the neuroaxis [6, 10]. In the end, we decided that due to the lack of conclusive data regarding her lumbar spine, general anesthesia would be a safer option.

In conclusion, this case report is meant to highlight the need for adequate preoperative assessment and investigations, especially in the presence of an uncommon medical condition the anesthesiologist may not be entirely familiar with.

Additionally, while at first glance, neuraxial blockade would seem to be the likely choice for this patient, benefits must be weighed against all possible risks.

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