THIEME OPEN ACCESS

Management of Prolactinoma during Pregnancy by Physicians from the Middle East and North Africa: A Case-Based Survey

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J Diabetes Endocrine Practice

Abstract

Introduction The guidelines for managing prolactinomas during pregnancy are primarily based on retrospective evidence or expert opinion.

Methods A case-based questionnaire was sent to a convenience sample of endocrinologists ($N = 116$) and internists ($N = 13$) in the Middle East ($N = 147$) and North Africa ($N = 33$). Three cases of varying severity were presented, ranging from microprolactinoma to large macroprolactinoma compressing the optic chiasm.

Results In the case of microprolactinoma, 86.7% of respondents would discontinue dopamine agonist (DA) medications when pregnancy is confirmed, 66.1% would discontinue serum prolactin measurement during pregnancy, and 95.4% would not request pituitary imaging routinely if no new symptoms developed. In contrast, only 20.0% would perform regular formal visual field (VF) testing throughout pregnancy. In the case of macroprolactinoma with no VF defect, 38.9% chose to discontinue DA therapy upon confirmation of pregnancy, 20.0% would either perform regular magnetic resonance imaging (MRI) during pregnancy or if serum prolactin were thought to be elevated out of proportion by clinical judgment, and 36.7% would not perform regular formal VF monitoring during pregnancy. In the management of macroprolactinoma with VF defect, 61.1% elected to continue DA therapy, whereas 33.9% considered referral for surgical excision as the treatment of choice. Note that 42.8% would perform regular MRIs during pregnancy, and 90.0% would perform regular formal VF monitoring.

Keywords
- survey
- professional practices
- prolactinoma
- prolactin
- dopamine agonists
- pregnancy outcome

DOI https://doi.org/10.1055/s-0045-1809442.
ISSN 2772-7653.

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

Conclusion A survey of physicians revealed a diversity in managing prolactinomas during pregnancy, better education and regional adoption of the guidelines.

Introduction

Prolactinoma is the most frequent functional benign pituitary adenoma, typically caused by either a micro- or macroadenoma. In most women of reproductive age, prolactinomas manifest as gonadal dysfunction and infertility.[1,2] Treatment with dopamine agonists (DAs) typically restores ovulation and fertility. Cabergoline is generally favored over bromocriptine due to its superior therapeutic efficacy. The use of DAs to treat prolactinomas during pregnancy is variable and primarily based on the treating physician's discretion. The experience with bromocriptine during pregnancy is approximately 10 times greater than cabergoline. Nonetheless, studies have shown no increased risk of spontaneous abortions, preterm deliveries, multiple births, or congenital malformations with the use of both agents compared with the general population.[3–5]

Once pregnancy is confirmed, it is generally advisable to stop using DAs, except in the case of invasive macroprolactinomas or pressure symptoms.[3–5] Significant prolactinoma growth during pregnancy may occur in 2.7% of women with microadenomas, 22.9% of those with macroadenomas without ablative treatment, and approximately 5% of macroadenomas who previously received ablative treatment. Women with macroadenomas should have visual fields (VFs) assessed periodically during pregnancy. If symptomatic tumor growth occurs, reinstitution of the DA therapy is usually successful in shrinking the tumor. If the pregnancy is sufficiently advanced, delivery is also an option and transsphenoidal debulking is rarely necessary.[3–5]

Detailed clinical practice guidelines for managing prolactinomas during pregnancy are primarily based on retrospective evidence or expert opinion.[6–8] The adherence of relevant specialists to these guidelines is limited. A limited number of questions on prolactinoma management during pregnancy were included in survey-based studies on the management of prolactinomas by physicians.[9–11] A Canadian survey used a case-based electronic questionnaire to assess the trends in managing prolactinomas during pregnancy over a decade ago.[12] Similarly, the present survey was conducted to assess management practices for prolactinomas during pregnancy in the Middle East and North Africa (MENA) region in more detail using a case scenario-based survey questionnaire analogous to the Canadian questionnaire.[12] Such an approach allows for testing regional management practices against the guidelines and comparing them with the Canadian study.

Materials and Methods

Study Design

A cross-sectional study was compared with similar data from the 2012 Canadian study. The electronic questionnaire service Google Forms was used to create, disseminate, and analyze the survey. We invited endocrinologists primarily residing and practicing in the MENA region who are likely to be involved in managing pituitary disease during pregnancy. The potential participants were identified using a similar strategy to our previous survey-based regional studies.[13–16] The initial invitation email explained the study's rationale. A couple of reminders were sent to the target population. The survey was open from October 8, 2024 to December 1, 2024. The comparative data from the 2012 Canadian study were extracted from the original publication.[12] The Canadian study invited practicing endocrinologists in four provinces identified by the respective provincial physician registration authorities. Thirty-four responses out of 60 invitations were captured.[12]

The Survey Questionnaire

The questionnaire had two parts. The first part captured the demographic and professional profile of the respondents, such as age, sex, residence, specialty, career stage, type of practice, duration of practice, and number of prolactinomas seen in a month. The second part is based on three clinical scenarios of varying severity of prolactinomas during pregnancy.[12] The cases ranged from microprolactinomas to large macroprolactinomas compressing the optic chiasm. For each case, a set of questions on the need, nature, and timing of (1) medical management, (2) biochemical monitoring, and (3) pituitary imaging and VF testing was provided.

Data Collection and Analysis

Survey responses were collected anonymously and stored electronically by the survey service, accessible and password-protected. No data were captured from nonrespondents or nonqualified ones. Responses from endocrinologists and internal medicine specialists interested in and practicing endocrinology were included. Data were analyzed using the survey tools for descriptive statistics (frequency and percentage) and exported to a Microsoft spreadsheet for further analysis. The comparative data from the 2012 Canadian study were extracted from the original publication.[12] The Canadian study included 34 responses.[12] The MENA and Canadian data were compared using Fisher's exact test.

Results

Demographic and Professional Profiles of Respondents

The demographic and professional characteristics of the respondents are detailed in ►**Table 1**. We included 180 physicians (103 males and 77 females). Most of them resided in the Arabian Gulf (68.9%) and North Africa (18.3%), with fewer respondents from the rest of the Middle East (12.8%). Most respondents were from Saudi Arabia (68) and the

Table 1 Demographic and professional profiles of the respondents from the MENA region (180 responders)

Questions and predetermined response options		Response (Yes %)
The region of residence and practice	Arabian Gulf Other Middle East North Africa	124 (68.9%) 23 (12.8%) 33 (18.3%
Sex	Man Woman	103 (57.2%) 77 (42.8%)
Professional specialty	Adult endocrinologist GIM with endocrinology interest	166 (92.2%) 13 (7.2%)
Career stage	Senior[a] Mid-grade	142 (78.9%) 38 (21.1%)
Type of practice	Tertiary Secondary	106 (41.1%) 74 (58.9%)
Nature of practice	Public Private	138 (76.7%) 42 (23.3%)
Years in specialty	< 5 6–10 11–20 > 20	54 (30.0%) 39 (21.7%) 50 (27.8%) 37 (20.6%)
Prolactinomas seen on average per month?	0–5 6–10 11–20 > 20	93 (51.7%) 54 (30.0%) 24 (13.3%) 9 (5.0%)

Abbreviations: GIM, general internal medicine; MENA, Middle East and North Africa.
[a]Senior defined doctors at the highest trade such as consultants or attending physicians.

United Arab Emirates (36), followed by Tunisia (26) and Iraq (22). Fewer responses were received from Qatar (8), Kuwait (7), Libya (5), Oman (3), Egypt (2), Bahrain (2), and Jordan (1). The majority were adult endocrinologists (92.2%). Over three-quarters were senior physicians, and the rest were mid-grade doctors; 41.1% worked in academic centers, and most in public institutions (76.7%). Less than one-third (30.0%) have been in practice < 5 years and 20.6% were in practice > 20 years; 51.7% of respondents see up to 5 prolactinomas, and 30% see 6 to 10 such cases in a month. In the comparative group, most responders (62%) were based at university hospitals, 29% were community-based solo practitioners, and 9% had a community-based endocrine group practice. Whereas all participating endocrinologists reported seeing patients with prolactinomas in their practice, 65% saw up to 5 cases, 21% between 6 and 10 cases, and 14% between 11 and 20 cases each month.

Management of Microprolactinoma

There was a high degree of conformity among responders regarding the medical management of microprolactinoma (►**Table 2**). A majority of specialists (86.7%) chose to discontinue DA therapy as soon as pregnancy was confirmed, while only 6.1% elected to continue with bromocriptine throughout pregnancy. Almost two-thirds (66.1%) of specialists did not recommend routine monitoring of serum prolactin during pregnancy, a minority (6.1%) would continue to monitor regular serum prolactin during pregnancy, and 27.8% would only check serum prolactin in case of new-onset headaches and/or vision changes. Most respondents (95.6%) indicated that they would only do pituitary imaging in case of new-onset headache and/or vision changes, whereas 8 (4.5%) responders would either perform regular pituitary imaging during pregnancy to exclude tumor enlargement, 1 (0.6%), or perform imaging when serum prolactin was thought to be out of proportion with their clinical judgment, 7 (3.9%). There was significant diversity in VF testing, with 64.5% indicating that they would perform standard VF testing only in case of new-onset headaches and/or vision changes. In comparison, 20.0% would do it regularly during pregnancy and 15.6% would either not perform formal VF testing or only informal (clinical) VF testing (►**Table 2**).

Management of Macroprolactinoma with No Visual Field Defect

There was greater diversity among responders regarding managing a macroprolactinoma with no visual effects (►**Table 3**). Seventy (38.9%) responders chose to discontinue DA therapy altogether as soon as pregnancy was confirmed, whereas 30.6% elected to replace cabergoline with bromocriptine due to better safety data, and 29.4% elected to continue cabergoline. With regards to biochemical monitoring, a majority of responders (55.3%) would discontinue monitoring during pregnancy, whereas 11.7% would continue to monitor serum prolactin regularly during pregnancy, and 33.0% would measure serum prolactin only in cases of new-onset headaches and/or vision changes. One hundred and forty-four (80%) of responders indicated that they would only do pituitary imaging in case of new-onset headaches and/or vision changes, whereas 20.0% would perform either regular pituitary imaging during pregnancy to exclude tumor enlargement or, in cases where serum prolactin was thought to be out of proportion, with clinical judgment. Similarly, there was a significant diversity concerning performing the VF testing; 63.3% of responders reported performing standard VF regularly throughout pregnancy, whereas 30.0% would do it only if the patient had new-onset headaches and/or vision changes; 6.7% would only perform informal (clinical) VF testing (►**Table 3**).

Management of Macroprolactinoma with Visual Field Defect

In the management of advanced prolactinomas during pregnancy (►**Table 4**), most responders (61.1%) elected to continue medical treatment, of which 15.0% chose cabergoline due to its better efficacy, while 46.1% preferred to use bromocriptine. However, just over one-third (33.9%) of responders chose surgical excision as the treatment of choice. Regarding biochemical monitoring through serum prolactin, half of the specialists decided to discontinue monitoring, while one-third would prefer to continue regular serum prolactin monitoring during pregnancy. Regarding imaging

Table 2 Summary of the clinical case (Case A), questions, and participants' responses in the MENA and the Canadian surveys

Case A summary: A 24-year-old nurse was seen for inability to conceive. Her initial screen showed an elevated prolactin level of 64 µg/L (normal level is 2 to 15 µg/L). A subsequent MRI scan confirmed the presence of a 5-mm pituitary adenoma. She was given bromocriptine (BCR), which normalized her menstruation as well as her prolactin level. One year ago, she asked if she could start cabergoline (CBG) instead because of its less frequent dosage. She was changed to CBG 0.5 mg twice weekly, and her prolactin levels have remained normal. She called your clinic yesterday to inform you that she was pregnant. How would you manage this patient?		
Aspect of care:	**Response (Yes %)**	
	MENA	**Canada[a]**
Medical management: Continue current DA therapy throughout pregnancy Discontinue CBG and change over to BCR due to better safety data **Discontinue DA therapy as soon as pregnancy is confirmed** Refer for surgical excision of the tumor Recommend therapeutic abortion	11 (6.1%) 11 (6.1%) **156 (86.7%)** 0 (0.0%) 2 (1.1%)	0 (0.0%) 2 (6.0%) **32(94.0%)** 0 (0.0%) 0 (0.0%)
Biochemical monitoring: Continue regular monitoring of serum prolactin during pregnancy **Discontinue monitoring serum prolactin during pregnancy** Measure serum prolactin only if the patient complains of new-onset headaches and/or vision changes	11 (6.1%) **119 (66.1%)** 50 (27.8%)	3 (8.8%) **27(79.4%)** 4 (11.8%)
Pituitary imaging: Perform regular imaging during pregnancy to exclude tumor enlargement Perform imaging if serum prolactin is thought to be out of proportion with your clinical judgment **Pituitary imaging should be performed only if the patient complains of new-onset headaches and/or vision changes**	**1 (0.6%)** **7 (3.9%)** **172 (95.6%)**	1 (2.9%) **1 (2.9%)** 32 (94.2%)
Visual field testing: Perform regular formal visual field testing throughout pregnancy **Perform formal visual field testing only if the patient complains of new-onset headaches and/or vision changes** Never perform formal visual field testing Only perform informal (clinical) visual field testing	36 (20.0%) **116 (64.5%)** 4 (2.3%) 24 (13.3%)	11 (32.2%) **20 (58.8%)** 2 (5.9%) 1 (2.9%)

Abbreviations: BCR, bromocriptine; CBG, cabergoline; DA, dopamine agonist; MENA, Middle East and North Africa; MRI, magnetic resonance imaging.
Note: Responses compatible with clinical guidelines are in bold.
[a]Canadian data were recalculated from Almalki et al.[12]

practices, 42.8% would perform regular pituitary imaging to exclude tumor enlargement, whereas 47.2% would perform pituitary imaging only if there were new-onset headaches and/or vision changes; 10.0% of responders would request pituitary imaging if serum prolactin were thought to be out of proportion with clinical judgment. Most (90.0%) of the specialists elected to perform regular formal VF testing during pregnancy, while 8.3% would do formal VF testing only if new-onset headaches and/or vision changes were reported (►**Table 4**).

Comparisons of MENA and Canadian Practices

The management of prolactinomas of varying severity during pregnancy by MENA and Canadian physicians is shown in ►**Tables 2** to **4**. In the management of microprolactinoma, there were no significant differences between the two groups' general trends in medical management, biochemical, radiological, or VF monitoring (►**Table 2**). However, when managing a macroprolactinoma with no visual effects (►**Table 3**), the DA therapy use pattern significantly differed between MENA and Canadian physicians, with fewer of the former group discontinuing DA altogether as soon as pregnancy was confirmed ($p = 0.0246$) (►**Table 3**). Similarly, there were significant differences in the approaches to biochemical monitoring ($p = 0.0309$) as shown in ►**Table 3**. However, no significant differences were detected between the groups concerning pituitary imaging and VF monitoring (►**Table 3**). When managing advanced prolactinomas during pregnancy, more MENA respondents tended to choose surgical excision as the treatment of choice than medical treatment, although the differences did not quite reach significance ($p = 0.06$). No differences were evident in the monitoring, imaging, and visual testing practices (►**Table 4**).

Discussion

The management of hyperprolactinemia and prolactinomas during pregnancy remains an area of limited evidence that requires more research.[1–5] Several general clinical practice guidelines were published on this topic, with[6–8] the Endocrine Society guidelines being the most widely applied in daily clinical practice.[6] Physicians' knowledge and practice concerning the management of prolactinomas during pregnancy is critical to optimize patients' care. Therefore,

Table 3 Summary of the clinical case (Case B), questions, and participants' responses in the MENA and Canadian surveys

Case B summary: A 37-year-old teacher had originally presented with milky breast discharge ~5 years ago. Subsequent investigations revealed an elevated prolactin level of 654 µg/L (normal level is 2–15 µg/L). A pituitary MRI confirmed a 2.1-cm pituitary macroadenoma. Visual field testing revealed a defect in her lower temporal field. She was started immediately on cabergoline 1.0 mg twice a week, and within 6 months, her serum prolactin level returned to normal, and her tumor shrank to 1.2 cm. Her visual field test results were normal. She has been under yearly surveillance, and her serum prolactin level has remained normal. She is now 4 weeks pregnant. How would you manage this patient?		
Aspect of care	**Responses, yes (%)**	
	MENA	**Canada[a]**
Medical management: Continue current DA therapy throughout pregnancy **Discontinue CBG and change to BCR due to better safety data** Discontinue DA therapy as soon as pregnancy is confirmed Refer for surgical excision of the tumor Recommend therapeutic abortion	53 (29.4%) **55 (30.6%)** 70 (38.9%) 2 (1.1%) 0 (0.0%)	2 (5.9%) 10 (29.4%) **22 (64.7%)** 0 (0.0%) 0 (0.0%)
Biochemical monitoring:		
Continue regular monitoring of serum prolactin during pregnancy **Discontinue monitoring serum prolactin during pregnancy** Measure serum prolactin only if the patient complains of new-onset headaches and/or vision changes	21 (11.7%) 99 (55.3%) 55 (33.0%)	8 (23.5%) 22 (64.7%) 4 (11.8%)
Pituitary imaging:		
Perform regular imaging during pregnancy to exclude tumor enlargement Perform imaging if prolactin is out of proportion (by clinical judgment) **Perform imaging only if the patient complains of new-onset headaches and/or vision changes**	21 (11.7%) 15 (8.3%) **144 (80.0%)**	6 (17.6%) 4 (11.8%) 24 (70.6%)
Visual field testing:		
Perform regular formal visual field testing throughout pregnancy Perform formal visual field testing only if the patient complains of new-onset headaches and/or vision changes Never perform formal visual field testing Only perform informal (clinical) visual field testing	**114 (63.3%)** 54 (30.0%) 0 (0.0%) 12 (6.7%)	**21 (60%)** 12 (37%) 0 (0.0%) 1 (2.9%)

Abbreviations: BCR, bromocriptine; CBG, cabergoline; DA, dopamine agonist; MENA, Middle East and North Africa; MRI, magnetic resonance imaging.
Note: Responses compatible with clinical guidelines are in bold.
[a]Canadian data were recalculated from Almalki et al.[12]

understanding the current practice and its concurrence with guidelines is interesting. Furthermore, identifying heterogeneity and gaps in clinical practice helps plan relevant research and develop guidelines for future policies. In contrast to the Canadian study, our survey was conducted when several guidelines were available.[6–8]

This study surveyed physicians managing pregnant women with prolactinoma to elucidate the clinical practice variation within the MENA region. Moreover, this study's findings were compared with similar studies globally. To the best of our knowledge, this is the first study to focus on the clinical practice of physicians in the MENA region treating prolactinomas during pregnancy. The study identified significant deviations from the clinical guidelines, some concerning. In women with microprolactinoma, 12.2% of the physicians will continue on DA, 33.9% will monitor prolactin levels, and 20% will perform regular VF testing. In women with macroprolactinoma and no VF defect, 60.1% will continue on DA, 44.7% will monitor prolactin levels, 8.3% will consider magnetic resonance imaging (MRI) if the prolactin levels are rising, 11.7% will perform regular MRI scans, and 63.3% will perform regular VF examination. In women with macroprolactinoma and VF defects, 61.1% will continue DA, 50.1% will measure prolactin levels, and 90.0% will perform regular VF examinations. These findings underscore the heterogeneity in clinical practice, with a clear gap between daily clinical practice and the available guidelines.[6–8]

The use of DA during pregnancy should consider the tumor size and its proximity to the optic chiasm. Because DAs cross the placenta, almost all guidelines recommend stopping them at conception. Furthermore, most societies support the continuation of DA in women with large suprasellar adenomas in proximity to the visual nerves. However, the phrasing of these recommendations is ambiguous. For example, the Endocrine Society states that the use of DA may be prudent in women with invasive adenomas or adenomas abutting the optic chiasm.[6] In contrast, the European Endocrine Society states that DA may be given longer in women with adenomas abutting the optic chiasm. In this study, most physicians (86.7%) will discontinue DA in microadenoma women. These results are consistent with other studies from Canada (94%), Brazil (70%), and China (63%)[9–11] and are in line with the 2011 Endocrine Society guidelines. This practice is justifiable as the risk of a clinically significant

Table 4 Summary of the clinical case (Case C), questions, and participants' responses in the MENA and Canadian surveys

Case C summary: A 30-year-old nulliparous accountant is 10 weeks pregnant. She was told 6 years ago that she had a large prolactinoma and was given bromocriptine. She last saw her specialist more than 3 years ago. She has been refilling her prescription through her family physician and takes her medication intermittently. Her menstruation has always been irregular, and when she started gaining weight 2 weeks ago, she did a pregnancy test, which was positive. Her family physician later confirmed this. She thinks she last took her bromocriptine ~3 months ago. When you examined her, she had bitemporal hemianopia on clinical visual field testing, and you requested an urgent MRI, which showed a 2.9 cm sellar tumor compressing the optic chiasm. Her serum prolactin level was 2400 µg/L. How would you manage this patient?		
Aspect of care	**Responses [Yes (%)]**	
	MENA	**Canada[a]**
Medical management:		
Restart previous DA therapy (BCR) throughout pregnancy	83 (46.1%)	23 (67.6%)
Start CBG due to its better efficacy	27 (15.0%)	5 (14.6%)
Discontinue DA therapy as soon as pregnancy is confirmed	3 (1.7%)	0 (0.0%)
Refer for surgical excision of the tumor	61 (33.9%)	6 (17.8%)
Recommend therapeutic abortion	6 (3.3%)	0 (0.0%)
Biochemical monitoring:		
Continue regular monitoring of serum prolactin during pregnancy	60 (33.3%)	14 (41.0%)
Discontinue monitoring serum prolactin during pregnancy	**90 (50.0%)**	**20 (59.0%)**
Measure serum prolactin only if the patient complains of new-onset headaches and/or vision changes	30 (16.7%)	0 (0.0%)
Pituitary imaging:		
Regular imaging during pregnancy to exclude tumor enlargement	77 (42.8%)	17 (49.0%)
Imaging should be performed if prolactin is out of proportion (clinical judgment)	18 (10.0%)	6 (17.0%)
Perform imaging only if the patient complains of new-onset headaches and/or vision changes	**85 (47.2%)**	**11 (34.0%)**
Visual field testing:		
Perform regular formal visual field testing throughout pregnancy	**162 (90.0%)**	**32 (94%)**
Perform formal visual field testing only if the patient complains of new-onset headaches and/or vision changes	15 (8.3%)	2 (6.0%)
Never perform formal visual field testing	0 (0.0%)	0 (0.0%)
Only perform informal (clinical) visual field testing	3 (1.7%)	0 (0.0%)

Abbreviations: BCR, bromocriptine; CBG, cabergoline; DA, dopamine agonist; MENA, Middle East and North Africa; MRI, magnetic resonance imaging.
Note: Responses compatible with clinical guidelines are in bold.
[a]Canadian data were recalculated from Almalki et al.[12]

increase in the size of microprolactinomas during pregnancy is generally low, ranging from 1.6 to 5.5%.[17–19]

In cases of macroprolactinoma, the use of DA is inconsistent across different cohorts. While 60.1% of the physicians in this study choose to continue on DA in women with no VF defects, most of the physicians in Canada (64.7%), China (53%), and Brazil (58%) will discontinue DA.[9,11,12] In women with VF defects, 61.1% will continue on DA, similar to 67% of Canadian physicians.[12] It is justifiable and aligned with available guidelines to continue DA in women with macroprolactinoma causing VF compression, as the evidence shows a 36% risk of adverse pregnancy outcomes and a 75% risk of visual impairment in pregnant women displaying these conditions.[18–23] As a result, guidelines recommend continuing DA therapy in invasive tumors near the optic chiasm.[6] However, in the case of macroprolactinoma without VF compression, the guidelines are not very clear. Although macroprolactinomas without VF compression are like microprolactinomas, being usually well-contained within the sella, the propensity of growth during pregnancy without medical treatment is unclear and is higher than microprolactinomas.[24] The risk of enlargement of such macroprolactinomas, especially if not treated with surgery or radiotherapy, has been reported to be as high as 32%.[23] These facts are likely the root of the heterogeneity in DA usage in women with macroprolactinomas without VF defects. This variability in practice may reflect differences in health care systems and international guidelines-driven practice. Well-designed studies aiming to elucidate the behavior of such tumors during pregnancy are needed.[6]

Pharmacotherapy preferences for treating prolactinomas during pregnancy vary by region. In the MENA region, bromocriptine is the most commonly used DA, preferred by 67% of endocrinologists, compared with 14.6% who choose cabergoline, especially for invasive macroprolactinomas. Canadian Practices 2012 reflected a similar approach, selecting bromocriptine for noncompressive circumstances while keeping cabergoline for larger prolactinomas.[12] In contrast, Chinese practitioners in 2018 preferred bromocriptine and rarely continued cabergoline, reflecting a more conservative stance.[11] Brazilian practices in 2010 were very similar to those in Canada and MENA, with bromocriptine being the most

commonly used drug during pregnancy and cabergoline reserved for aggressive tumors.[12] In 2011, the Endocrine Society recommended the use of bromocriptine. In 2021, the European Society slightly preferred cabergoline to bromocriptine,[7] and the Pituitary Society preferred cabergoline in 2023[25] due to growing evidence of safety.[21,22] Bromocriptine's safety has been well established, with studies involving over 6,000 pregnancies showing no increased risk of miscarriage or congenital malformations.[23] Despite its effectiveness, cabergoline was long reserved for resistant cases due to limited long-term data in the older literature.[26–31]

Prolactin levels correlate with the size of the adenoma. Outside pregnancy, a rise in prolactin levels suggests an increase in the size of the adenoma. Pregnancy is associated with a 10-fold increase in the levels of prolactin.[32] Besides, in women with prolactinoma, prolactin levels might not rise during pregnancy.[33] All guidelines consistently recommend against measuring prolactin levels during pregnancy. The main concern is that the rise in prolactin might trigger unnecessary investigations or treatments without a clear reference range. Despite these guidelines, 33.9, 44.7, and 50.1% of the surveyed physicians in this study will measure prolactin levels during pregnancy in women with microprolactinomas, macroprolactinomas with no VF defect, and macroprolactinomas with VF defect, respectively.

VF monitoring is instrumental in assessing the significant growth of pituitary macroadenomas. Evidence of new-onset VF defects or progression of an existing defect should trigger further investigations such as MRI. During pregnancy, the recommendations for VF monitoring are not consistent. The Endocrine Society and the European Endocrine Society recommend VF assessment in women with new pressure symptoms or clinical evidence of VF defects.[6,7] The Pituitary Society recommends a 3-month evaluation of VF in all women with macroadenomas.[25] Both MENA and Canadian practitioners conduct VF testing regularly, particularly for patients with macroadenomas accompanied by existing optic chiasmal compression—rates of 90% in MENA and 94% in Canada.[12] One-third of MENA physicians will not monitor VF in women with macroadenoma without VF defects. However, 20% of clinicians conduct these tests reactively for microadenomas, even without symptoms.

The 2011 Endocrine Society guidelines recommend against routine MRI during pregnancy in patients with microadenomas or intrasella macroadenomas unless there is clinical evidence of tumor growth, such as VF compromise.[7] Imaging practices in this study indicate an appropriate reactive approach, primarily in response to symptoms that may suggest tumor growth, such as new-onset headaches or vision changes. In microprolactinoma, 95.6% of MENA and 94.2% of Canadian respondents supported imaging only for symptomatic patients.[12] However, nearly half of the surveyed practitioners in both MENA and Canada perform regular imaging for large prolactinomas with chiasmal compression.[12]

Although the study is based on self-reported physicians' practices, a case-based questionnaire of three cases allows the respondents to make choices similar to those needed in daily clinical practice. Scenario-based questions are more realistic than direct questionnaires. The study has a few noteworthy limitations. First, the methodology of a cross-sectional survey of physicians' responses to a case scenario is inferior to a true audit-type quality assurance exercise based on processes and outcomes of real patients. Second, the inhomogeneous representation of the regions (a single country has over one-third of respondents and limited participation of other large countries) may limit the generalizability of the findings. However, we chose to forsake using quotas in favor of including a large number of willing participants. Third, selection bias by those who chose to participate could influence the results. Fourth, the possible differences in resource availability in different countries and local settings may have influenced the choices of treatment and monitoring. However, it should truly reflect actual clinical practice and quality of care, which is the ultimate objective of this study. Finally, just over half of the respondents see 5 or fewer cases of prolactinomas on average per month. Although these cannot be deemed pituitary experts, their practices influence patient care provision and outcome. A similar proportion was included in the Canadian study as a real-world study.

Conclusion

The study underscores the complicated landscape of prolactinoma management during pregnancy, revealing particularly significant variations in macroprolactinoma management and a consensus on discontinuing DA therapy for microprolactinomas. Insights drawn from Canadian, Chinese, Brazilian, and other international studies reflect a shift toward individualized care, balancing standardized management protocols with the clinicians' unique experiences and the specific needs of patients, thereby striving to optimize treatment outcomes within a diverse global context.

Authors' Contributions

S.A.B. and M.H.A. conceived the study's idea. S.A.B. adapted the questionnaire, managed the online survey, and drafted the manuscript. All other authors reviewed the data, revised the manuscript, and approved its final version.

Compliance with Ethical Principles

Although participation in the study poses no risk at all to participants, however, the Institution Review Board of Sheikh Khalifa Medical City, Abu Dhabi, approved the study [Reference Number: REC-13.08.2017 [RS-502]. Respondents provided digital informed consent before answering the survey questions, and all data were analyzed anonymously.

Funding

None.

Conflict of Interest

None declared.

Acknowledgments

We are grateful to all the colleagues who responded to the survey. We also appreciate the inspiration we had from the Canadian study and acknowledge the original intellectual effort made in developing the original survey instrument that we have adopted.

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