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NEUROLOGY IN PRACTICE

Evaluation of inpatients neurology consultations in the department of gynecology, obstetrics, and reproductive medicine of a tertiary hospital in Turkey

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Abstract

Background & Objective: It is important to be aware of hormonal changes in neurological disease in neurology training. We aimed to investigate the most common disorders which resulted in the clinicians from the Department of Gynecology, Obstetrics, and Reproductive Medicine (GORM) to ask for neurology consultation from the Department of Neurology. *Methods:* All the neurology consultations requested from the Department of GORM between 2015 and 2023 at Harran University Hospital, Sanliurfa, Turkey, were retrospectively evaluated with regard to demographic characteristics, the reason for referral, neurologic diagnoses, and treatment, imaging features. SPSS statistical software version 22 (IBM Inc. NC, USA) was used to perform all statistical analyses. *Results:* There were 333 patients with a mean age of 32.5 years (range 17-68) seeking consultations; 287 had obstetric problems, and 46 had gynecological issues. In the obstetric group, pre-eclampsia and Posterior Reversible Encephalopathy Syndrome (PRES) were the most frequent final neurological diagnoses, while headache and acute cerebrovascular disease were the most common frequent problems in the gynecological group. The number of consultations rose from 23 in 2015 to 66 in 2022. The predicted rate of final diagnosis of GORM residents was 58%. The neurologist's contribution has substantial influence on the management of 208 (62%) patients.
Conclusion: Neurologists have a significant contribution to the management of GORM inpatients. In neurological training, importance should be given to the effect of hormonal changes on neurological diseases in neurology training.

Keywords: Neurology training, inpatients, gynecology, pregnancy, postpartum

INTRODUCTION

Neurology is a complex section of medicine investigating central and peripheral nervous system diseases. The effect of gender discrepancy on neurological diseases can be linked to biological and environmental factors, health-seeking behaviors, or diagnostic bias. Hormonal and reproductive alterations in women may cause neurological disorders. Pregnancy, menopause, and hormonal therapy are associated with neurological diseases.[1]

The contribution of inpatient neurology consultations to patients' management is important. After neurology evaluation, 21-63% of patients had a change in diagnosis, and 21-88% of patients in their treatment plan.[2-7] In some studies, all neurology consultations from the hospital were evaluated, whereas, in others, consultations requested from specific departments such as intensive care units or emergency departments were assessed.[6-9] In our literature review, studies on consultation from the Department of Gynaecology, Obstetrics, and Reproductive Medicine (GORM) have yet to be

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carried out. Sanliurfa has the highest fertility and crude birth rate in Turkey.[10] Therefore, we aimed to evaluate the characteristics of inpatient neurology consultations in the Department of GORM and the contribution of the Department of Neurology to these patients.

METHODS

The present study was an 8-year retrospective study conducted at Harran University Hospital, Sanliurfa, Turkey, from 2015 to 2023. All cases aged >16 years requiring neurology consultations from the Department of GORM were screened for inclusion. The study was approved by the local ethics committee of Harran University Medical Faculty in 2023 (protocol number: HRU/23.12.13).

We recorded age, clinical presentation, neurological examination, number and year of consultations, previous history, gestational age at delivery, gravity and parity numbers, imaging features, and electroencephalography (EEG). For each patient, the reason for the consultation and the final neurological diagnosis, treatment, and patient's outcome, such as whether discharged or transferred to neurology or another inpatient clinic after consultation, were documented. More than one consultation requested for a patient was accepted as a single consultation.

We defined the first six weeks following childbirth as the puerperium. A resident or consultant in neurology evaluated the patients. Any patient seen by a resident was discussed with the consultant.

The neurologist's contribution to management was considered substantial if a change in the patient's investigations, diagnosis, or treatment was recommended.

Data collection was done using Microsoft Excel. SPSS statistical software version 24 (IBM Inc. NC, USA) was used to perform all statistical analyses. The categorical variables were expressed as frequencies with percentages while compared with the Pearson Chi-square and Fisher exact test. Statistical significance was set at a P-value≤0.05.

RESULTS

There were 712 neurology consultations from the Department of GORM in the study period. After excluding recurrent consultations, 333 patients were included in the study. Of these 333 patients with a mean age of 32.5 years (range 17-68), 287 had obstetric problems, and 46 had gynecological issues. In the obstetric group, 53 were pregnant, and 234 were puerperium. The characteristics of patients and consultations are shown in Table 1.

The number of consultations was a minimum of 1 and a maximum of 13 times per patient. The average number of consultations was 2.14 times per patient. Most patients had more than one consultation reason and final neurological diagnosis.

Epilepsy was the most common previous history in the obstetric group, while Cerebrovascular Disease (CVD) was in the gynecological group. The most common reasons for consultations were pre-eclampsia and eclampsia in the obstetric group, while headache was in the gynecological group. Pre-eclampsia and eclampsia patients were asked for consultation more in the puerperium rather than during pregnancy (Figure 1). In the obstetric group, pre-eclampsia and Posterior Reversible Encephalopathy Syndrome (PRES) were the most frequent final neurological diagnoses, while headache and acute CVD were in the gynecological group (Figure 2). The final diagnoses of 196 patients were the same as consultation reasons; in other words, GORM residents diagnosed the patients correctly with a rate of 58%.

The consultation rate of the GORM department compared to all departments increased from 7% in 2015 to 22% in 2022. While it has increased yearly since 2017, it has decreased in 2020. The most frequently requested reason for consultation in 2015 was eclampsia, while in 2022, pre-eclampsia was the most common reason. The most common final diagnosis was PRES in 2015 and pre-eclampsia in 2022.

All PRES patients (n=44) were diagnosed during the puerperium. 6 patients were diagnosed with computer tomography(CT) and 38 patients were diagnosed with magnetic resonance imaging(MRI).

Of 13 CVD patients, 9 (2 pregnant, 7 puerperium) were in the obstetric period, and 4 were in the gynecological period. Eleven of the patients were ischemic, 1 had hemorrhagic, and 1 had hemorrhagic transformation of ischemic stroke. Consultations were requested due to pre-eclampsia in 2, eclampsia in 4, seizure in 2, and Hemolysis, Elevated Liver enzymes, and Low Platelets (HELLP) syndrome in 1 of the patients.

Of the consultations for the management of patients with previous history, 59 were given in the pre-operative period and 29 in the postoperative period. Pre-operative consultations were requested because 31 had a history of epilepsy (4 had a history of intracranial mass), 27 had a history of

Table 1: Characteristics of patients and consultations

	Pregnancy(n=53)	Puerperium(n=234)	Gynecology(n=46)
Age, median (min-max) in year	30 (18 - 45)	31 (17 - 55)	43 (19 - 68)
Number of Consultations, median(min-max)	1 (1-4)	2 (1-8)	2 (1-13)
Pregnancy features, median(min-max)			-
Pregnancy week	36 (5-39)	36 (6-41)	-
Pregnancy gravida	3 (1-14)	4 (1-14)	5 (0-17)
Pregnancy abort	0 (0-9)	1 (0-6)	0 (0-5)
Pregnancy live	2 (0-9)	3 (0-12)	5 (0-13)
Previous History, n(%)			
Epilepsy	31 (58%)	14 (6%)	8 (17%)
Brain tumour	3 (5.7%)	5 (2%)	3 (6%)
CVD	18 (34%)	11 (5%)	11 (24%)
HT	2 (4%)	10 (4%)	5 (11%)
DM	2 (4%)	10 (4%)	4 (9%)
MS	2 (4%)	3 (1%)	1 (2%)
IIH	1 (2%)	0	0
Others	3 (5.7%)	8 (3%)	4 (9%)
Abnormal NE, n(%)	8 (15%)	67 (29%)	8 (17%)
Abnormal MRI, n(%)	6 (11%)	62 (27%)	9 (19%)
Abnormal EEG, n(%)	1 (2%)	5 (2%)	0
Antiepileptic drugs, n(%)			
Levetiracetam	16 (30%)	23 (10%)	5 (11)
Carbamazepine	5 (9%)	4 (1.7%)	1 (2)
Valproate	3 (5%)	0	2 (4)
Lamotrigine	3 (5%)	5 (2%)	0
Topiramate	0	1 (0.4%)	0
Oxcarbazepine	0	1 (0.4%)	1 (2%)
Phenytoin	1 (2%)	4 (1.7%)	0

CVD: Cerebrovascular Disease, HT: Hypertension, DM: Diabetes Mellitus, MS: Multiple Sclerosis, PTC: Idiopathic Intracranial Hypertension, NE: Neurological Examination, MRI: Magnetic resonance imaging, EEG: Electroencephalography

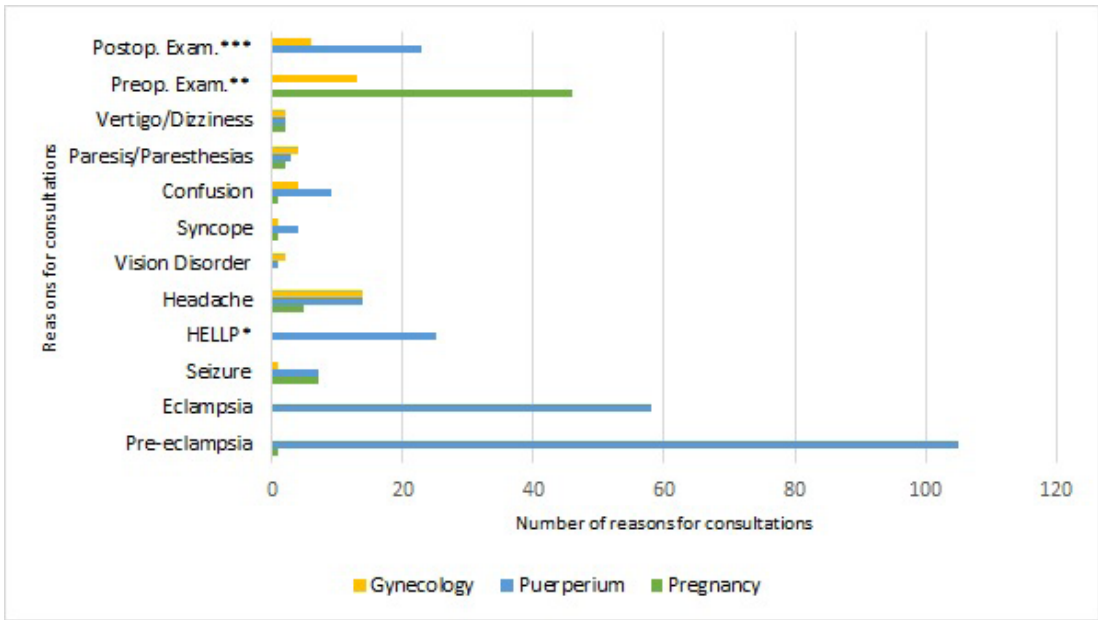
CVD, and 1 had a history of Idiopathic Intracranial Hypertension (IIH).

After consultations, 11 patients were transferred to the neurology inpatient clinic and 3 to another inpatient clinic. 2 patients died. 317 patients were discharged after their treatment ended. The neurologist's contribution substantially influenced the management of 208 (62%) patients.

DISCUSSION

It is important to be aware of hormonal changes in neurological disease for neurology training. Likewise, the influence of neurology is extremely substantial in the management of inpatient clinics.[3,5,7] Our findings shows the effect of the neurology department on the management of patients in the GORM inpatient consultation, with a high rate of 62% resulting in substantial influence on the management, are consistent with other studies performed in different inpatient clinics.

Pre-eclampsia is the most common pregnancy complication characterized by new-onset hypertension after 20 weeks of gestation, associated with proteinuria or signs of end-organ dysfunction. Eclampsia is defined as new onset seizures/convulsions in a patient with pre-eclampsia without any other cause.[11-14] CVD and epilepsy were the most frequent neurological diagnoses in most studies.[3-5,7] In the present study, the most common reason for consultation was pre-eclampsia and eclampsia, while pre-

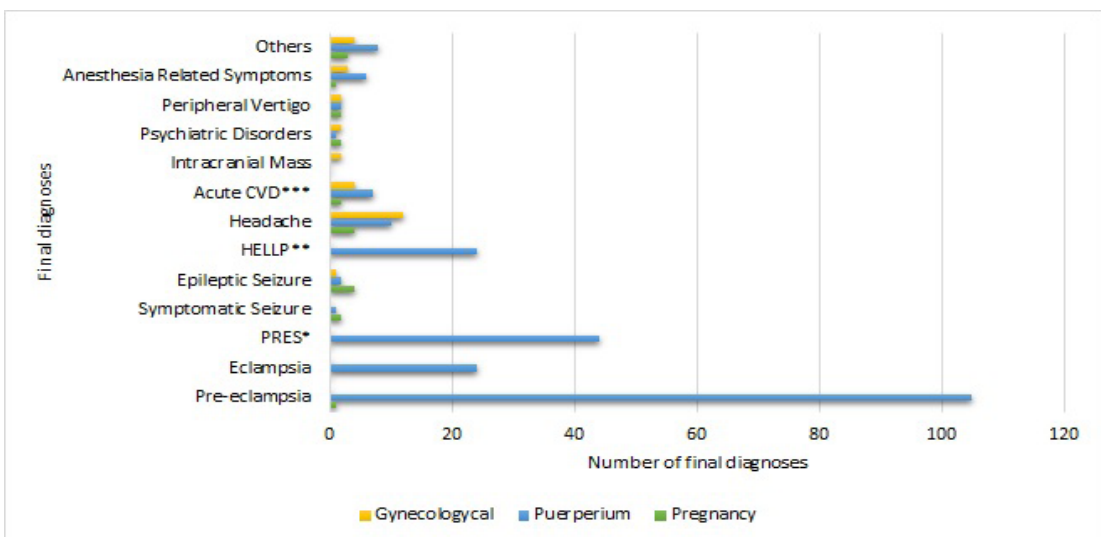


* Hemolysis, Elevated Liver enzymes, and Low Platelets Syndrome
** Pre-operative Examination
*** Post-operative Examination

Figure 1. Reasons for the consultations

eclampsia and PRES were the most frequent final neurological diagnoses in the obstetric group. Pre-eclampsia and eclampsia patients were more asked for consultation in the puerperium than during pregnancy. We thought it was due to the rapid-action reflexes of GORM residents in the face of hypertensive diseases of pregnancy.

PRES is a clinicoradiological diagnosis that is characterized by edema in brain imaging. CT is usually the first-choice imaging modality in acute cases, and PRES is usually diagnosed using CT alone. On the other hand, MRI is preferred to CT due to its superior resolution, especially of posterior fossa structures.[15] We diagnosed PRES



* Posterior Reversible Encephalopathy Syndrome
** Hemolysis, Elevated Liver enzymes, and Low Platelets Syndrome
*** Acute Cerebrovascular Disease

Figure 2. Final diagnoses

mostly with MRI rather than CT in our patients. Both pre-eclampsia and eclampsia are suggested to be associated with PRES in the literature.[11-14] In our study, PRES patients had eclampsia more than pre-eclampsia.

The perimenopause period is the preceding decade before menopause and involves fluctuating hormone levels, which can increase migraine frequency.[16] It is suggested that women with ≥5 live births had a higher risk for stroke compared to 1 or 2 live births.[17] Our gynecology group compatible with the perimenopause period comprises 46 patients with higher age and parity than the obstetric group. In the present study, the most common reason for consultation was headache, while headache and acute CVD were the common final neurological diagnoses in the gynecological group.

Whether there is an increased risk of stroke during pregnancy and puerperium is controversial. In some studies, both pregnancy and the puerperium are considered to increase the relative risk of stroke, while in others, it is suggested that only the puerperium increases the risk of both ischemic and hemorrhagic stroke.[18-21] Most stroke patients in our study were in the obstetric group, especially in the puerperium.

While the number of consultations has been increasing yearly since 2017, we linked the decline in 2020 to pandemic conditions because of COVID-19. In some studies, the number of inpatient consultations seen by the neurology department has increased over the years[6,22] similar to our study. In contrast, urgent inpatient neurological consultations decreased year by year in another study.[1] In the first two studies, an increase in consultations was supposed to be associated with growing diagnostic complexity and specific treatment approaches in neurology.[6,22] In the last study, in which a decrease was observed, the reason for the decrease was attributed to more basic medical information was included in the resident education system.[1] In the present study, together with all of these reasons, we believe that increased defensive medicine is another reason. While the most common reason for consultation was eclampsia, a related disorder to neurology in 2015, we attribute to the same reasons why pre-eclampsia, which is less related to neurology than eclampsia, was the most common reason for consultation in 2022.

Of the 106 patients consulted for the reason and diagnosed with pre-eclampsia after the consultations, 90 patients had normal neurological examinations in the present study. According to the literature, approximately 10% of patients with medical conditions will suffer from neurological disorders, and a careful medical history and neurological examination could aid doctors in making differential diagnoses of neurological disease. In recent years, there has been a notable increase in medical malpractice cases against GORMs in Turkey and around the world; consequently, GORMs report increasingly practicing defensive medicine and avoiding many risky interventions.[23,24] Also, the prevalence of burnout syndrome was higher among GORM residents.[25] In our opinion, due to the increasing malpractice cases, burnout syndrome, and lack of knowledge about neurology, GORM residents requested neurologists for consultation for patients with a normal neurological examination and non-neurological problems such as pre-eclampsia, leading to a work overload of neurologists.

The main limitation of our study was its retrospective nature. The second limitation concerns the lack of documentation of the prognosis of patients, particularly those with a neurological diagnosis.

In conclusion, neurologists have a significant contribution to the management of GORM inpatients. For a multidisciplinary approach, importance should be given to the effect of hormonal changes on neurological diseases in neurology training. More attention should be paid to training in basic neurological examination among medical students and GORM residents in neurology to increase the diagnostic rate in neurological disorders of GORM residents and to prevent work overload of neurologists. In addition, precautions should be taken to reduce burnout syndrome and defensive medicine of GORM doctors.

DISCLOSURE

Ethics: The study was approved by the local ethics committee of Harran University Medical Faculty in 2023 (protocol number: HRU/23.12.13). All the neurology consultations requested from the Department of GORM between 2015 and 2023 at Harran University Hospital, Sanliurfa, Turkey, were retrospectively evaluated.

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