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Breast cancer survival in Guerrero: oncologic care and geographic disparities in Mexico

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Abstract

Background: *Breast cancer (BC) represents a public health concern among women. Despite the incidence and disparities in economic status, the state of Guerrero in Mexico demonstrates a lower BC mortality rate.* **Objective:** *This study investigates the epidemiological characteristics, treatment modalities, and survival outcomes of BC patients in Guerrero, and compares these findings with national data.* **Method:** *A retrospective cohort of 923 BC patients treated at the Instituto Estatal de Cancerología Dr. Arturo Beltrán Ortega, from 2010 to 2018 was analyzed. To determine the prognostic factors affecting survival, we employed overall survival analysis and the Cox proportional hazards model.* **Results:** *The 5-year survival rate was of 73% (CI 95%: 69-76). BC patients ≤ 40 years exhibited lower survival rates and a 1.5-fold higher risk of mortality. When comparing the triple-negative subtype to HER2-positive tumors, no significant differences in reducing the risk of death were observed.* **Conclusion:** *Despite a higher prevalence of aggressive molecular subtypes in Guerrero, patients share clinical and epidemiological features with their counterparts in other Mexican regions.*

Keywords: *Breast cancer. Mexico. Regions. Molecular subtype. Survival time.*

Supervivencia del cáncer de mama en Guerrero: atención oncológica y disparidades geográficas en México

Resumen

Antecedentes: *El cáncer de mama (CM) representa un problema de salud pública entre las mujeres. A pesar de la incidencia y las disparidades en el estatus económico, el estado de Guerrero en México demuestra una tasa de mortalidad por cáncer de mama más baja.* **Objetivo:** *Este estudio investiga las características epidemiológicas, las modalidades de tratamiento y los resultados de supervivencia de los pacientes con CM en Guerrero y compara estos hallazgos con datos nacionales.* **Método:** *Se analizó una cohorte retrospectiva de 923 pacientes con CM atendidos en el Instituto Estatal de Cancerología Dr. Arturo Beltrán Ortega, del 2010 al 2018. Para determinar los factores pronósticos que afectan la supervivencia, empleamos el análisis de supervivencia general y el modelo de riesgos proporcionales de Cox.* **Resultados:** *La tasa de supervivencia a 5 años fue del 73% (IC 95%: 69-76). Los pacientes con BC ≤ 40 años mostraron tasas de supervivencia más bajas y un riesgo de mortalidad 1.5 veces mayor. Al comparar el subtipo triple negativo con los tumores HER2 positivos, no se observaron diferencias significativas en la reducción del riesgo de muerte.* **Conclusión:** *A pesar de una mayor prevalencia de subtipos moleculares agresivos en Guerrero, los pacientes comparten características clínicas y epidemiológicas con sus homólogos de otras regiones mexicanas.*

Palabras clave: *Cáncer de mama. México. Regiones. Subtipo molecular. Tiempo de supervivencia.*

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Introduction

Breast cancer (BC) is the most common malignant tumor among women globally and remains the leading cause of cancer-related death. Despite advancements in diagnosis and treatment, developing countries bear a significant burden, accounting for 45% of global incidence and 55% of deaths. In Mexico, the estimated incidence and mortality rates for BC are 39.5 and 9.9 cases/100,000, respectively[1,2]. BC is the most prevalent neoplasm in Mexican women[3], and institutions such as Instituto Nacional de Cancerología (INCan) and Fundación de Cáncer de Mama (FUCAM) have contributed to understanding the clinical and epidemiological characteristics of the populations they serve[4-7]. These studies highlight the significance of clinicopathological factors in disease prognosis[5,7,8]. Despite this, the impact of the health system and the economic-related factors, so important for disadvantaged people, in the diagnosis, treatment, and mortality of BC, has been neglected. These factors are relevant, as Mexico has one of the highest levels of inequality in the OECD with a Gini index of 45[9,10]. Therefore, there is still a need for regional-level epidemiological studies to comprehend the impact of biological, social, and cultural disparities on BC incidence and mortality.

Therefore, sharing our experience in treating this disease within the population of Guerrero state holds great value. Notably, the Colima Consensus reported a low BC mortality rate in spite of a high poverty proportion (38.7% moderate poverty and 26.9% extreme poverty)[3,11]. Guerrero state is characterized by a predominantly native American (70.9%) and Afro-descendant (3.2%) genetic makeup, particularly in the coastal regions of Acapulco and Costa Chica, which have significant public health implications[4,12,13]. This study aims to describe the clinical, pathological, and epidemiological characteristics of BC patients in Guerrero and compare them with existing reports on the Mexican population.

Material and methods

We conducted a retrospective review of clinical records from the Instituto Estatal de Cancerología (IECan) Dr. Arturo Beltran Ortega in Acapulco, Guerrero, Mexico, covering the period from January 2010 to December 2018. The study focused on patients diagnosed with BC. Demographic data, clinicopathological characteristics, treatment modalities, histopathological type, immunohistochemistry (IHC) profile, and current patient status were extracted and analyzed. Histopathologic evaluations were performed by pathologists, and the presence of hormone receptors (HRs) was determined using the H-Score[3] method through IHC analysis. Descriptive statistics were computed for each variable. Overall survival (OS) and disease-free survival (DFS) were estimated using the Kaplan-Meier method, and the log-rank test was employed to assess statistical differences between survival functions based on clinical characteristics. Furthermore, we utilized an adjusted Cox proportional hazards model (HRM) to identify clinical variables that could predict survival in the study population. Statistical significance was set at $p < 0.05$. All data analyses were conducted using SPSS v22 software (SPSS, Inc., Chicago, IL, USA).

Results

A total of 923 clinical records were analyzed, encompassing a population consisting of 91.3% women from the seven regions of the state of Guerrero. The remaining 8.7% comprised patients from neighboring southeast states. Table 1 presents the demographic and reproductive risk factors. The mean age at the time of BC diagnosis was 53.0 (±12.0) years. The population displayed mean menarche at 12.9 ± 1.3 years, mean age of first pregnancy at 21.6 ± 5.2 years, mean age at menopause at 45.7 ± 5.1 years, and 236 (25.6%) patients reported contraceptive use. Common comorbidities among the population included diabetes and hypertension. A history of first-degree family cancer was observed in 17.2% of the population. The clinical stage at diagnosis predominantly represented stage II (37.9%) and stage III (36.1%). Regarding histologic grade, well-differentiated or grade I tumors accounted for 7.2% of the total, moderately differentiated (grade II) for 45.9%, and poorly differentiated (grade III) for 43.6%. HR-positive tumors comprised 79% of cases, with the Luminal A subtype being the most common (35.1%, n = 324), followed by Luminal B (15.9%, n = 147), Luminal B human epidermal growth factor receptor 2 (HER2) positive (14.4%, n = 133), HER2 positive (13.5%, n = 125), and triple negative (21%, n = 194). Mastectomy was performed in 96.9% of the population, and 89.2% received chemotherapy, with 49.8% receiving adjuvant and 39.4% neoadjuvant chemotherapy. Furthermore, 60.3% of the population underwent radiotherapy (Table 1).

The median OS of the cohort was 49 months, with a 5-year OS rate of 73% (95% confidence interval [CI], 69-76). Among patients with metastatic disease, the 5-year OS rate was 67% (95% CI, 63-70). Analysis of

Table 1. Description of demographic and clinical pathological characteristics of breast cancer patients

Variable	Frequency (%)
Age, years (mean ± standard deviation)	53.0 ± 12.0
Median (rank), years	52 (19-93)
Family history of cancer	
No	764 (82.8)
Yes	159 (17.2)
Comorbidity	
Diabetes	64 (6.9)
Hypertension (only)	137 (14.8)
Diabetes and hypertension	65 (7.0)
Other	13 (1.4)
Reproductive factors	
Age at menarche, years	12.9 ± 1.3
Age first pregnancy, years	21.6 ± 5.2
Oral contraceptive use (yes)	236 (25.6)
Age at menopause, years	45.7 ± 5.1
Lymph node metastasis	
Positive	467 (51)
Negative	432 (47)
Stage	
I	32 (3.5)
II	350 (37.9)
III	333 (36.1)
IV	132 (14.3)
Molecular subtype	
Luminal A (HR+/HER2–)	324 (35.1)
Luminal B (HR ± /HER2–)	147 (15.9)
Luminal B HER2 positive (HR ± /HER2+)	133 (14.4)
HER2 positive (HR–/HER2+)	125 (13.5)
Triple negative (HR–/HER2–)	194 (21)
Surgical treatment	
Mastectomy	894 (96.9)
Breast-conserving surgery	29 (3.1)
Chemotherapy	
Adjuvant	413 (45)
Neoadjuvant	295 (32)
Palliative	129 (14)
No chemotherapy	86 (9)
Radiotherapy	
Yes	557 (60.3)
No	366 (39.6)

Mean ± standard deviation. HR: hormone receptors; HER2: human epidermal growth factor receptor 2.

5-year survival revealed significant differences based on age at diagnosis ($p < 0.0001$). Patients older than 40 years exhibited higher median survival, with a 76% survival rate. In comparison, the survival rates were 63% for patients aged 31-40 years and 12% for those ≤ 30 years old. Furthermore, stage IV patients had a lower survival rate of 29% (Table 2).

Examining survival in relation to tumor differentiation grade, we observed a 80% survival rate for grades I and II, whereas grade III tumors showed a 64% survival rate. Molecular subtype analysis demonstrated a 5-year survival of 84% for Luminal A tumors, 81% for Luminal B tumors, 70% for Luminal B HER2-positive tumors, 59% for HER2-positive tumors, and 58% for triple-negative tumors. Among patients with metastases, the observed survival rate was 35% (Table 2).

Adjusted multivariate analysis, accounting for age at diagnosis, histologic grade, clinical stage, molecular subtype, and metastasis, revealed a 1.5-fold increased risk of BC-related death for patients diagnosed before 40 years of age. Luminal A and Luminal B tumors were associated with a 61% and 50% decrease in the risk of death, respectively, while Luminal B HER2-positive tumors showed a 40% decrease. However, no significant difference was observed in reducing the risk of death between Triple-negative and HER2-positive subtypes. Notably, the presence of metastasis increased the risk of death by 27 fold (Table 3).

Subsequently, we compared our findings from the IECan Dr. Arturo Beltrán Ortega (IECan) with data from other institutions, including the INCan[7,8], the FUCAM[6,14], the breast clinic of the Instituto Jalisciense de Cancerología, Guadalajara (IJC)[1], and the Centro Estatal de Cancerología, Veracruz (CECan)[15]. Our patients exhibited demographic and clinical characteristics that were similar to those reported in other regional studies. The age at diagnosis, family history, and histologic type, specifically ductal carcinoma, were comparable across populations. The distribution of molecular subtypes, however, showed slight variations (Table 4).

In our study (IECan), the luminal subtype (Luminal A and Luminal B HER2 positive) accounted for 65.4% of the tumors, similar to the prevalence observed in CECan, IJC, and INCan, but not reported by FUCAM (76.6%). Concerning the HER2+ tumor subtype, our study found a prevalence of 14%, slightly higher than the 8.7% reported by FUCAM and the 10.5% observed in IJC and CECan. Notably, HER2-positive tumors were more prevalent in INCan (23%) compared to our study (13%) (Table 4). Finally, the triple-negative subtype in our study exhibited a prevalence of 21%, which aligned with the prevalence reported by IJC and was slightly lower than the 23.5% observed in CECan. Interestingly, the prevalence of the triple-negative subtype in INCan (16%) and FUCAM (15%) was lower compared to the data from other national and international studies[8,12,14,16].

In terms of mean follow-up duration, IECan demonstrated a significantly longer period of follow-up compared

Table 2. Overall survival from breast cancer diagnosis to date of last contact or death

Variable	Total	Events	Percent 1-year OS	Percent 3-year OS	Percent 5-year OS	p
Global analysis	923	244	97 (96-98)	84 (82-87)	73 (69-76)	
Age						
19-30	21	15	95 (85-100)	45 (27-75)	12 (2.4-63)	0.0001
31-40	120	44	94 (90-98)	70 (62-79)	63 (54-73)	
41-50	264	67	98 (96-100)	85 (80-89)	75 (69-81)	
51-60	275	70	97 (96-99)	88 (84-92)	76 (71-83)	
61-70	167	33	99 (97-100)	91 (84-92)	75 (67-84)	
> 70	76	15	96 (92-100)	87 (80-95)	80 (70-91)	
40-year-old threshold						
≤ 40	141	59	94 (90-98)	66 (58-75)	56(48-66)	0.0001
> 40	782	185	98 (97-99)	87 (85-90)	76 (7280)	
Histologic grade						
Low	66	12	94 (88-100)	89 (81-97)	80 (68-93)	0.0001
Intermediate	424	78	98 (97-100)	90 (87-93)	80 (75-85)	
High	402	145	96 (95-98)	77 (73-81)	64 (59-70)	
Molecular subtype						
Luminal A (HR+/HER2–)	324	59	99 (98-100)	94 (92-97)	84 (79-89)	0.0001
Luminal B (HR ± /HER2)	147	23	99 (97-100)	91 (87-96)	81 (73-90)	
Luminal B HER2 positive (HR ± /HER2+)	133	42	99 (98-100)	82 (76-89)	70 (62-80)	
HER2 positive (HR–/HER2+)	125	48	93 (88-97)	73 (65-81)	59 (50-70)	
Triple negative (HR–/HER2–)	194	72	95 (92-98)	70 (63-77)	58 (51-67)	
Metastasis						
Yes	290	228	94 (91-97)	57 (51-63)	35 (29-40)	0.0001
No	633	16	99 (98-100)	98 (97-99)	97 (95-98)	

Percentage % and (95% CI). HR: Hormonal receptor; HER2: human epidermal growth factor receptor 2; OS: overall survival.

to other hospitals. However, the OS and DFS rates at 5 years were lower in IECan than in other institutions, except for IJC. When comparing our survival results, we observed a median follow-up duration of 49 months, which was higher than the reported durations of 40.5 months in INCan, 46.8 months in IJC, and 28 months in FUCAM. The 5-year OS in our study was 73%, similar to the rate reported by IJC (78.5%), but slightly lower than the rates reported by INCan and FUCAM.

Regarding survival by subtypes, IECan showed 84% and 81% survival for the luminal subtypes (Luminal A and Luminal B), which were slightly lower than the 89% reported by FUCAM (Table 4). In addition, IECan reported a survival rate of 70% for the Luminal B HER2-positive subtype, while FUCAM reported 81.9%. In the HER2-positive subtype, our patients exhibited a 59% survival rate, which differed from the 74.9% reported by FUCAM. The survival rate for the triple-negative subtype in IECan was 58%, contrasting with the 69.5% reported by FUCAM, while IJC reported a 52.9% survival rate[1,8,14].

In summary, IECan displayed inferior survival rates across all subtypes compared to FUCAM. The differences in tumor subtype observed in our population, as compared to populations from other states, provide essential data for studying tumor heterogeneity.

Discussion

BC detection in Mexican patients often occurs at advanced stages of the disease (III and IV). In terms of pathology features, prevalent characteristics include ductal histology, intermediate or high-grade tumors, and HR-positive tumors[7,8,17]. These results differ from reports issued by other Mexican states, such as Jalisco (IJC), Mexico City, and Veracruz (CECan), which have significantly contributed to the understanding of BC epidemiology in our country.

The variation observed in previous reports reflects the heterogeneity of the disease and its outcomes across different geographical regions. Histological grade is recognized as a determining factor for the biological behavior of tumors and serves as a useful prognostic tool. Moreover, estrogen and progesterone

Table 3. Multivariate analysis for breast cancer-specific survival (Cox proportional regression model)

Variable	HR	(95% CI)	p	HR	(95% CI)	p
Age, years						
≤ 40	2.2	1.62-2.89	0.0001	1.54	1.14-2.09	0.005
> 40	1	1	1	1	1	1
Clinical stage						
I	1	1	1	1	1	1
II	1.03	0.31-3.37	0.95	1.05	0.27-4.01	0.94
III	3.1	0.98-9.86	0.052	1.19	0.32-4.41	0.75
IV	13.2	4.20-41.79	0.0001	1.84	0.50-6.83	0.36
Histologic grade						
Low	1	1	1	1	1	1
Intermediate	0.89	0.49-1.60	0.69	0.69	0.38-1.26	0.23
High	1.63	0.92-2.88	0.08	0.80	0.45-1.43	0.45
Breast cancer subtype						
Luminal A (HR+/HER2–)	0.37	0.26-0.53	0.0001	0.39	0.27-0.56	0.0001
Luminal B (HR ± /HER2)	0.38	0.24-0.60	0.0001	0.50	0.31-0.79	0.004
Luminal B HER2 positive (HR ± /HER2+)	0.64	0.43-0.94	0.02	0.60	0.40-0.90	0.015
HER2 positive (HR–/HER2+)	1	1	1	1	1	1
Triple negative (HR–/HER2)	0.94	0.65-1.36	0.77	1.07	0.73-1.56	0.71
Metastasis						
No	1	1	1	1	1	1
Yes	36.2	21.80-60	< 0.0001	27.45	16-46.9	0.0001

HR: Hormonal receptor; HER2: human epidermal growth factor receptor 2; CI: confidence interval.

receptors, along with overexpression of the HER-2 oncoprotein, are considered prognostic and predictive factors[18]. Our analysis of subtypes was based on the immunohistochemical approach, allowing us to gain a comprehensive understanding of their behavior and establish differences between them. Our data align closely with the descriptions provided by CECan and show slight variations compared to IJC, INCan, and FUCAM reports. Notably, the proportion of triple-negative tumors in our population is higher than that reported by national institutions (INCan and FUCAM). However, this proportion is like the data reported by CECan. This finding is noteworthy because the proportion of Afro-descendants in Veracruz (CECan) is higher compared to other regions, and the economic conditions are similar to Guerrero[15,19].

At present, there is a lack of studies in our country that investigates the ancestral background of BC patients in specific populations. Understanding the tumor heterogeneity and prognosis in BC patients can be aided by considering the ancestral diversity within these populations. In Guerrero, the population exhibits mixed ethnic diversity, with a significant presence of self-identified native Americans and Afro-descendants, particularly in the coastal regions of Acapulco and Costa Chica[12]. The African ancestry in Mexico has been reported as 1.8 ± 3.5% (mean ± standard deviation), while in Mexico City, an African component of 3.5% has been described according to HapMap[20]. In states such as Veracruz, the African ancestry is approximately 2 ± 4.2%, while in Guerrero, it reaches 4.1 ± 6.1%[19].

Furthermore, the majority of our BC patients come from Costa Chica and Costa Grande, which have the highest proportion of Afro-descendant population (> 7%)[12]. This information holds significance in public health, as studies suggest that African American women (AA) have a higher predisposition to early-onset aggressive BC[18,21]. Churpek et al. in 2015 reported that 80% of AA BC patients carried mutations in the *BRCA1* and *BRCA2* genes, while 20% had mutations in *PALB2*, *CHEK2*, *BARD1*, *ATM*, *PTEN*, or *TP53* genes[18]. These regional differences in mortality may be associated with causative or risk-influencing genetic factors or protective effects conferred by the genetic background.

On the other hand, in Mexico, most cases are diagnosed in advanced stages (50-60%), far above than reported for countries with early detection programs[6,14]. In 2011, Bright et al. studied the influence of health system factors as responsible for the delay in BC diagnosis in Mexico. The authors found that the median time from symptom onset to treatment was 5.2 months:7.5 months for early clinical stages and 4 months for advanced clinical

Table 4. Patient demographics and clinical outcomes in different cancer institutions in Mexico

Variable	IECan (This study)	INCan (7)	INCan (8)	FUCAM (6,12)	IJC (1)		CECan (13)
	n = 923	n = 4300	n = 4316	n = 3762	n = 172		n = 1446
Global							
Age, years (mean ± standard deviation)	53 ± 12	52 ± 12.1	ND	53.7 ± 12.2	51.4		52.5 ± 12.1
Age							
≤ 40	15.3	15.3	15.4	13.3	ND		15.2
> 40	84.7	84.7	84.6	86.7	ND		84.8
Family history of cancer							
Yes	17.2	ND	ND	9.5	45.9		ND
No	82.8	ND	ND	90.5	54.1		ND
Histopathology							
Ductal	82.7	85.1	ND	79.7	87.2		ND
Lobular	4.1	9.4	ND	7.8	9.9		ND
Other	13.2	5.5	ND	12.5	2.9		ND
Histologic grade							
Low	7.2	18.5	15.7	9.1	10.7		16.4
Intermediate	45.9	30.1	29.1	54.1	56.5		83.6
High	43.6	51.3	55.25	34.6	32.7		
Lymph node metastasis							
Positive	51	ND	ND	ND	69		43.2
Negative	47	ND	ND	ND	5.9		56.8
Clinical stage							
I	3.5	14.2	12	36.4	8.7		41.6
II	37.9	36.6	35.15		33.1		
III	36.1	36.2	39.2	45.2	52.3		58.4
IV	14.3	12.9	13.65	7.7	5.8		
Molecular subtype							
Luminal A (HR+/HER2–)	35.1	60.7	56.95	65.7	55.8		43.9
Luminal B (HR ± /HER2)	15.9				12.2		21.1
Luminal B HER2 positive (HR ± /HER2+)	14.4			10.9			
HER2 positive (HR–/HER2+)	13.5	23.2	24.1	8.7	10.5		11.2
Triple negative (HR–/HER2–)	21	16	18.9	14.6	21.5		23.8
Metastasis							
Yes	33	24	ND	ND	24.4		13.5
No	67	76	ND	ND	75.6		86.5
Clinical outcomes							
Median follow-up	49		40.5	40	28	ND	ND
5-year OS	73		82	81	83.1	78.5	ND
5-year DFS	67		ND	80.6	81.8	46.8	ND

INCan: Instituto Nacional de Cancerología; FUCAM: Fundación de Cáncer de Mama; IJC: Instituto Jalisciense de Cancerología; IECan: Instituto Estatal de Cancerología Dr. Arturo Beltran Ortega, CECan. Centro Estatal de Cancerología de Veracruz. ND: no data; HR: hormonal receptor; HER2: human epidermal growth factor receptor 2; OS: overall survival, DFS: disease-free survival.

stages. In contrast, among high-income countries, the median total intervals range between 30 and 48 days, and > 60% of patients begin treatment in the first 3 months after symptom discovery[22,23]. The findings suggest that in developing countries as Mexico, the prolonged referral time from primary to specialty care accounts for most of the delay, especially for patients in early stages[22,24].

With respect to our study, the diagnosis occurs in advanced stages of the disease, and the time that elapses between the symptoms and the first consultation is approximately 9-12 months. In most cases, the patients were aware of the symptoms, but not of the importance of the diagnosis, so they did not prioritize seeking medical help. These findings could be attributed to low educational level related to preventive care, but also related

to disease's perception, the influence of cultural/religious practices, but also to the preference of alternative medicine in a daily basis. Therefore, the delay in diagnosis could be not always associated with the health institution's deficiencies but more related to the social factors.

Considering this, in Mexico and in our study, the features associated with BC lethality can be attributable to the high rate of population marginalization and result of a limitations in educational and health-care access. Despite this, other possible causes of these differences can be related to factors such as population aging, the "westernization" of the lifestyle, and the genetic background of each population[3]. Interestingly, the *per capita* income in Guerrero is one of the lowest of Mexico[16].

Finally, one of the main challenges encountered in this study relates to the specific population under analysis. The IECan primarily caters to marginalized populations within Guerrero. The patients treated do not receive medical attention from national health institutions such as IMSS or ISSSTE, which provide medical services to private or public Mexican workers. National statistics indicate that in Mexican municipalities with over 10% of the Afro-descendant population, approximately 76% of the population lacks IMSS or ISSSTE coverage, while for the general population, this figure is around 41%[25]. Therefore, it is possible that the percentage of Afro-descendants in our study population is higher than reported in typical BC studies. Further genetic and epidemiological analyses are necessary to elucidate the factors contributing to the mortality rates observed in this region.

Conclusion

The characterization of the clinical and epidemiological profiles of different regions is crucial for identifying risk and prognostic factors, which in turn inform strategies for individualized treatment decision-making. Regional data, particularly in areas with diverse ethnic origins and socioeconomic marginalization, are essential for developing targeted approaches to prevention and early diagnosis, thereby improving the care of BC patients. While Guerrero exhibits marginalization, most epidemiological parameters align with those reported in national studies. However, the frequency of the triple-negative subtype is unique to the population in this study. Therefore, the local disparities in BC mortality rates in Guerrero remain unexplained and necessitate further analysis. Nevertheless, the local and regional information from Guerrero will be invaluable for public health decision-makers.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical disclosures

Protection of people and animals. The authors declare that no experiments have been carried out on humans or animals for this research.

Data confidentiality. The authors declare that they have followed their workplace's protocols regarding the publication of patient data.

Right to privacy and informed consent. The authors have obtained approval from the Ethics Committee for the analysis and publication of routinely obtained clinical data. Informed consent from the patients was not required as it was a retrospective observational study.

Use of artificial intelligence to generate texts. The authors declare that they have not used any type of generative artificial intelligence in the writing of this manuscript or for the creation of figures, graphs, tables, or their corresponding captions or legends.

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