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Case Report

Clinical Features and Treatment Strategies for Primary Immune Thrombocytopenia in Late Pregnancy: An Analysis of Six Cases

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Abstract

Background: Primary immune thrombocytopenia (ITP) during pregnancy is an acquired autoimmune disorder characterized by a decreased platelet count ($<100 \times 10^9$/L) due to the presence of platelet-specific autoantibodies. Although ITP is rare, with an incidence of just 1–10 cases per 10,000 pregnancies, it poses significant risks of maternal hemorrhage and neonatal thrombocytopenia. Management options include first-line treatments such as corticosteroids and intravenous immunoglobulin (IVIG), while second-line therapies (high-dose steroids, or splenectomy) are reserved for refractory cases. Treatment is aimed at maintaining safe platelet thresholds ($>30 \times 10^9$/L during pregnancy and $>50 \times 10^9$/L for delivery) rather than achieving normal levels, thereby balancing maternal safety with fetal considerations. Multidisciplinary management involving hematologists, obstetricians, and neonatologists is essential for optimal outcomes. **Case**: 6 primiparous women with severe ITP in late pregnancy (platelet count $<20 \times 10^9$/L) were treated with a comprehensive regimen including prednisone, recombinant human thrombopoietin, IVIG, and platelet transfusions, resulting in increased platelet counts (range of 48 to 294 $\times 10^9$/L). All 6 cases exhibited platelet counts $<20 \times 10^9$/L, gestational ages ranging from 32 to 34+ weeks, and were hospitalized for induction of labor. **Conclusions**: Individualized comprehensive treatment can effectively manage severe ITP during late pregnancy, with protocols tailored to each patient's condition, gestational age, and platelet count fluctuations.

Keywords: thrombocytopenia during pregnancy; corticosteroids; intravenous immunoglobulin; recombinant human thrombopoietin; platelet transfusions; individualized treatment

1. Introduction

Primary immune thrombocytopenia (ITP) during pregnancy is an acquired autoimmune disorder characterized by reduced platelet count and increased risk of bleeding, with an incidence of approximately 1–10 per 10,000 pregnant women [1]. Pregnancy may exacerbate pre-existing ITP, or trigger its first manifestation in previously undiagnosed cases [2]. ITP during pregnancy not only increases the maternal hemorrhage risk, particularly during delivery, but may also cause neonatal thrombocytopenia through the placental transfer of autoantibodies [3]. The pathophysiology of ITP during pregnancy largely mirrors that of non-pregnant cases, involving primarily the autoantibody-mediated destruction of platelets, and decreased platelet production [4]. Pregnancy can influence the course of ITP through immunomodulatory mechanisms, leading to deterioration in some patients, whereas others may experience improvement [5]. Management of ITP during pregnancy follows a stepwise approach. First-line treatments such as corticosteroids (prednisolone) and intravenous immunoglobulin (IVIG) are considered relatively safe during pregnancy. Second-line options for refractory cases include higher-dose corticosteroids and repeated IVIG administration. In some cases, splenectomy is also performed, but this is typically avoided during pregnancy except in emergencies. Thrombopoietin receptor agonists (TPO-RAs) and rituximab are generally not recommended during pregnancy due to limited safety data. Treatment decisions must balance maternal safety with fetal risk considerations, and therapeutic targets are therefore often set to achieve safe rather than normal platelet counts (i.e., $>30 \times 10^9$/L for most pregnant women, $>50 \times 10^9$/L for delivery). Multidisciplinary management involving hematologists, obstetricians, and neonatologists is essential to optimize outcomes for both mother and infant [6]. The present study analyzed clinical data from 6 patients with severe ITP in late pregnancy (platelet count $<20 \times 10^9$/L upon admission) treated at Sichuan Provincial People's Hospital in 2024. We investigated the clinical characteristics, treatment approaches, and maternal-fetal outcomes of late-pregnancy ITP.

2. Materials and Methods

This study included 6 primiparas aged 24–33 years and admitted to our hospital after 32 weeks of gestation. All were admitted due to low platelet counts found during prenatal examinations. Some patients had a previous diagnosis of thrombocytopenia. One patient presented with symp-

toms of skin ecchymosis and epistaxis. The range of platelet counts for these patients at admission was 3–17 $\times 10^9$/L.

2.1 Therapeutic Drugs and Related Information

Prednisone is used to increase the platelet count. It is taken orally, with a dose range of 15–50 mg/d, and is produced by Shandong Lukang. The batch number is (2112282), and origin is (Jining, Shandong, China).

Recombinant human thrombopoietin (rhTPO) is administered by subcutaneous injection at a dose of 15,000 U/d. It is produced by Shengyang Sansheng, with batch number (2005004) and origin (Shenyang, Liaoning, China).

Intravenous human immunoglobulin was used at a dose of 22.5 g/d. It is produced by Chengdu Rongsheng, with batch number (2122304) and origin (Chengdu, Sichuan, China).

Oxytocin is used to prevent uterine atony during cesarean section. It is administered intravenously to promote uterine contractions and is produced by Shanghai, Hefeng, with batch number (1230305) and place of origin (Shanghai, China).

Kabei oxytocin is used in combination with oxytocin to promote uterine contractions during cesarean section. It is produced by Hainan Huanglong, with batch number (2033887) and the place of origin (Haikou, Hainan, China).

2.2 Treatment Methods

For patients with a platelet count $<10 \times 10^9$/L, priority is given to platelet transfusion. A combination of IVIG, prednisone and rhTPO is used concurrently. When the platelet count is $>40 \times 10^9$/L, cesarean section is performed to terminate the pregnancy. Patients with a platelet count $>10 \times 10^9$/L are initially treated with IVIG, prednisone and rhTPO. The platelet count is closely monitored, and the gestational age is prolonged as much as possible. If the drug treatment is not effective, an appropriate amount of platelet transfusion is carried out. Cesarean section was also performed once the platelet count had risen to $>40 \times 10^9$/L.

3. Case Presentation

This study included a total of 6 patients, with ages ranging from 24–33 years. All patients were admitted to hospital after 32 weeks of gestation. Additionally, all patients were primigravid (i.e., first pregnancy). The primary reason for admission was detection of a low platelet count during prenatal examination. Most patients were asymptomatic, with only one patient (Case 6) presenting with skin ecchymoses and epistaxis. Some patients had a previous diagnosis of thrombocytopenia. Initial laboratory tests revealed the platelet counts ranged from 3–17 $\times 10^9$/L. Treatment was tailored to the severity of each patient's thrombocytopenia. For patients with extremely low platelet count ($<10 \times 10^9$/L), priority was given to platelet transfusions in order to rapidly increase the platelet number. These patients simultaneously received IVIG, prednisone, and thrombopoietin. Once the platelet count exceeded 40 $\times 10^9$/L, cesarean section was performed to terminate the pregnancy.

For patients with a platelet count $>10 \times 10^9$/L, the initial approach focused on medical management using IVIG, prednisone, and thrombopoietin. Platelet counts were closely monitored, and pregnancy was prolonged when possible. In cases where drug therapy proved insufficient to increase platelet numbers, limited platelet transfusions were administered. Cesarean section was performed once the platelet count had risen above 40 $\times 10^9$/L.

The treatment strategy was critically important due to the high maternal-fetal risks associated with severe thrombocytopenia, particularly when the platelet count falls below 10 $\times 10^9$/L. At this level, patients face a significant risk of spontaneous bleeding in vital organs, including cerebrovascular accidents, gastrointestinal hemorrhage, and urogenital bleeding. The primary goal was to initiate aggressive treatment between 32–34 weeks of gestation when the fetus is near maturity, thereby ensuring the safety of both the mother and child. Following comprehensive treatment, all 6 patients showed varying degrees of improvement in their platelet count, ranging from 48–294 $\times 10^9$/L. Following platelet-augmenting treatment, all patients were delivered by cesarean section at an appropriate gestational age to ensure the safety of the mother and child (Table 1).

Patient #5 is a highly instructive case. This pregnant woman was diagnosed with severe thrombocytopenia platelets (PLT) $<11 \times 10^9$/L) during early pregnancy. After consultation by the multidisciplinary team (MDT), the pregnancy was deemed to pose an extremely high risk, with potential mortality due to thrombocytopenia-induced visceral hemorrhage in the mother. The MDT therefore recommended termination of the pregnancy. However, the patient insisted on continuing the pregnancy. She was subsequently hospitalized five times during pregnancy due to persistently low platelet counts (9–11 $\times 10^9$/L) and underwent comprehensive treatments, incurring substantial medical expenses.

During hospital admission, patient #5 declined treatments such as IVIG and TPO-RAs due to financial constraints, opting instead for platelet transfusion followed by cesarean delivery. She continued prednisone treatment at 15 mg daily (initiated in first trimester). Prior to surgery, the transfusion of two units of platelets rapidly increased her platelet count to 44 $\times 10^9$/L, possibly due to the comprehensive therapies she had received earlier.

To address potential uterine atony during cesarean section, all patients received intravenous oxytocin and carbetocin to promote uterine contractions. Despite these interventions, some patients experienced suboptimal uterine contractions. The estimated blood loss during surgery ranged between 400–600 mL across the patient group.

Table 1. Clinical data for patients with severe primary immune thrombocytopenia in late pregnancy.

Case	Age (years)	Gravidity and parity	Gestational age at admission	Platelet count at admission/$\times 10^9$/L	Treatment regimen after admission				Intraoperative blood loss (mL)	Discharge platelet count/$\times 10^9$/L	Follow-up platelet count
					Blood transfusion/ therapeutic unit	Corticosteroids	rhTPO	IVIG/g			
1	28	G1P0	32 + 6 w	6 (2024.07.08)	5	40 mg qd	15,000	22.5	500	84 (2024.07.12)	51 (2024.9.2)
2	24	G1P0	32 + 6 w	17 (2024.08.13)	2	50 mg qd	15,000	22.5	600	110 (2024.08.23)	81 (2024.8.30)
3	29	G2P0	34 + 2 w	8 (2024.08.31)	3	50 mg qd	15,000	22.5	500	49 (2024.09.05)	29 (2024.9.14)
4	27	G1P0	32 + 4 w	16 (2024.09.20)	2	50 mg qd	15,000	22.5	500	48 (2024.09.24)	118 (2024.12.25)
5	29	G2P0	33 + 2 w	9 (2024.11.30)	3	15 mg qd	-	-	600	90 (2024.12.02)	Lost to follow up
6	33	G2P0	34 + 5 w	3 (2024.12.03)	3	50 mg qd	15,000	22.5	400	294 (2024.12.14)	Lost to follow up

G, gravidity; P, parity; w, week; rhTPO, recombinant human thrombopoietin; IVIG, intravenous immunoglobulin.

Table 2. Neonatal condition.

Case	Apgar score	Birthweight (g)	Neonatal platelet count	Cutaneous ecchymoses and petechiae	Discharge platelet count	Length of hospital stay (days)
1	7 (skin color–1, muscle tone–1, respiratory effort–1) - 9 (muscle tone–1) - 9 (muscle tone–1)	1600	66	scattered hemorrhagic spots on both lower limbs	232	9
2	9 (skin color–1) – 10 – 10	2450	165	None	159	5
3	9 (skin color–1) – 10 – 10	2790	115	None	135	8
4	9 (skin color–1) – 10 – 10	2220	120	None	355	7
5	9 (skin color–1) – 10 – 10	1870	303	None	240	10
6	9 (skin color–1) – 10 – 10	2600	159	None	241	9

Neonatal outcomes were favorable. One newborn had Apgar scores of 7-9-9, while the remaining five scored 9-10-10. Due to prematurity, all 6 newborns were transferred to the Neonatal Intensive Care Unit (NICU) for specialized medical care and monitoring. No visible congenital anomalies were observed in any of the newborns. Birthweights ranged from 1600–2790 g, reflecting the preterm nature of the deliveries. The newborn in Case 1 presented with thrombocytopenia (platelet count 66 $\times$ 10^9/L) and scattered hemorrhagic spots on both lower limbs, with a suspected association to maternal thrombocytopenia. The remaining five newborns had normal platelet counts and no skin ecchymoses or petechiae. After 5–10 days of treatment in the NICU, all infants were discharged in a stable condition. None of the newborns exhibited significant thrombocytopenia (Table 2). Maternal platelet counts showed significant improvement at discharge (median platelet count of 87 $\times$ 10^9/L). All patients recovered well with no serious complications.

4. Discussion

This study reviewed the diagnostic and treatment processes for 6 patients with severe ITP in late pregnancy. Our comprehensive therapeutic approach, comprising prednisone, rhTPO and IVIG, as well as platelet transfusions when necessary, yielded favorable outcomes in all cases. Following treatment, Cases 3 and 4 were discharged with platelet counts of 49 $\times$ 10^9/L and 48 $\times$ 10^9/L, respectively. The absence of significant hemorrhagic tendencies indicated that safe clinical parameters were achieved, thus justifying discharge. Case 5 required five hospital admissions during pregnancy for recurrent thrombocytopenia, and received multimodal therapy. During the final admission, the patient declined high-cost interventions (IVIG and rhTPO) for financial reasons. However, platelet transfusion alone yielded a satisfactory result, possibly due to the prior therapeutic interventions. Prednisone is used in first-line therapy and inhibits the reticuloendothelial system from clearing antibody-coated platelets, while also suppressing antiplatelet antibody production. IVIG rapidly increases the platelet count by blocking macrophage Fc receptors, downregulating anti-platelet antibody production, and neutralizing existing anti-platelet antibodies. This makes it particularly suitable for situations requiring urgent elevation of the platelet count. rhTPO promotes megakaryocyte proliferation and differentiation, thereby enhancing platelet production. The integrated application of these therapeutic modalities was associated with favorable outcomes in the management of ITP in late pregnancy (Fig. 1).

This study analyzed 6 parturients with critical gestational thrombocytopenia (PLT $<$20 $\times$ 10^9/L). Stratified management was implemented as follows:

PLT $<$10 $\times$ 10^9/L: urgent transfusion + IVIG/prednisone/rhTPO $\rightarrow$ cesarean at PLT $>$40 $\times$ 10^9/L.

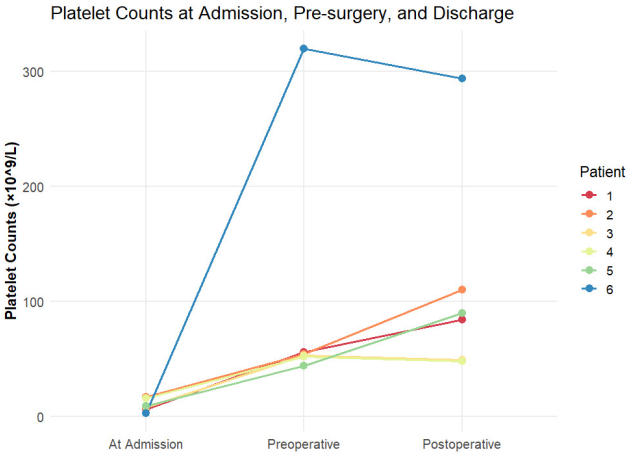

Fig. 1. Platelet counts at admission, pre-surgery, and discharge.

PLT 10–20 $\times$ 10^9/L: primary pharmacotherapy $\rightarrow$ transfusion if refractory $\rightarrow$ cesarean at PLT $>$40 $\times$ 10^9/L.

The limited sample size of this study limits the generalizability of results, but the above protocol demonstrates clinical feasibility. Individualized treatment protocols and MDT consultations also played crucial roles. Treatment intensity was calibrated according to the platelet count, clinical manifestations (such as epistaxis), and gestational age, with close monitoring of platelet level fluctuations throughout therapy. Complex cases benefited from treatment plans formulated after consultation with hematology and rheumatology/immunology departments, or hospital-wide clinical conferences.

The limitations are that case series inherently may have limitations due to the small sample size and lack of a control group.

5. Conclusions

In conclusion, ITP during pregnancy requires an individualized and comprehensive treatment approach. A prednisone-based regimen, combined with rhTPO and IVIG, as well as platelet transfusion when necessary, can lead to platelet recovery, ameliorate clinical symptoms, and safeguard maternal and fetal well-being. To achieve optimal outcomes, treatment should be modified according to the condition of each patient, gestational age, and dynamic changes in platelet counts. For patients with profound thrombocytopenia, more aggressive treatment protocols may be necessary to ensure safe delivery, including emergency measures such as platelet transfusions.

Availability of Data and Materials

The data supporting this study's findings are available from the corresponding author upon reasonable request.

Author Contributions

XZ, HQ was responsible for the conceptualization of the research. CC conducted the investigation. HQ participated in the review and editing of the manuscript. CC, JR, HQ analyzed the data. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study was carried out in accordance with the guidelines of the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Sichuan Provincial People's Hospital (approval number: [20240801012]). All patients gave written informed consent when they participated in the study.

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Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.31083/CEOG38783.

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