

The relationship of D-Dimer level with various diseases

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Abstract:

D-dimer is a biomarker of thrombosis considered to predict poor outcomes in patients with various diseases. This study aimed to find out the relationship between levels of D dimer in different diseases. 556 blood sample analyses for D dimer Patients' were collected from private laboratories, isolation, and health care centres in the Derna, Al- Gubba City, and its surrounding areas, Plasma separation from the tube containing sodium citrate, Preparation of I-Chroma D-Dimer Quantitative kits reagent. The Frequency and Percent of the Gender were 278 (50%) for males, 278 (50%) for females and for Chronic Diseases, the highest percent for Pneumonia was 121 (21.8%), followed by Blood Pressure at 77 (13.8 %). Diabetes Miletus 51 (9.2%), and for other diseases 71 (12.8%), the type of infection, the highest percent for Viral Infection was 498 (89.6%), followed by Surgery 23 (4.1%), Deep Vein Thrombosis 18 (3.2%), and for Respiratory Diseases 17 (3.1%), the level of D dimer which the highest percent for Moderate 247 (44.4%), followed by High 149 (26.8%). The result of D dimer was Normal 109 (19.6%), and the very high result of 51 (9.2%), the relationship between D dimer result and chronic disease was the highest for blood pressure followed by pneumonia, diabetes Miletus, Anemia, kidney disease, and Heart disease, The correlation between D dimer for age and chronic diseases, p -value $< \alpha = 0.05$, and there is not a significant relationship between D dimer and type of infection and gender p -value < 0.05 . We concluded that the obtained results prove that among obtained results, there is a strong relationship between age and chronic diseases, an increase in the level of D-dimer, level in the blood is not an indication of a specific disease, but rather a signal and alert for several diseases, many diseases

Introduction:

D-dimer is a soluble fibrin degradation product that results from ordered breakdown of thrombi by the fibrinolytic system [23]. D-dimer is a fibrin degradation product that is observed in the blood following clot degeneration. Currently, tests determining the concentration of D-dimer in the blood are widely employed in various clinical practices [11]. Elevated level of D-dimer, fibrinogen, and FDP is indicator of disease progression in COVID-19. Thus, regular estimation of these simple coagulation parameters may predict disease severity and help in adequate management [18]. Elevated D-dimer levels reportedly predict the onset of deep vein thrombosis (DVT) after total hip arthroplasty or total knee arthroplasty [9]. D-dimers are a cost-effective tool used for diagnosing diseases [20].

Blood coagulation includes a cascade of enzymatic reactions that lead to the conversion of fibrinogen into fibrin. The reverse process is called fibrinolysis and this destroys fibrin clots through

the enzymatic cleavage of fibrin into soluble fragments [10]. The prognostic ability of d-dimer among patients with CAP appeared to be good at correctly identifying high-risk populations of poor outcomes, suggesting potential for clinical utility in patients with CAP [11]. The D-dimer value, and the prothrombin time international normalized ratio (PT-INR) [8]. D-dimer has been used in the diagnostic process of various conditions, including the exclusion of venous thromboembolism, diagnostic scores for disseminated intravascular coagulation (DIC) [13]. Cancer and pneumonia were frequently present when ultra-high plasma D-dimer levels [17]. D-dimer testing has a reputation for being very non-specific, an extremely elevated D-dimer is uniquely associated with severe disease, mainly including VTE, sepsis and/or cancer [19]. Plasma D-dimer is an essential accompaniment of CTCs in GC that is easy to measure and lower in cost, and can be used in the detection of hematogenous metastasis [3]. The breakdown of fibrinogen and fibrin by plasmin is counterbalanced by multiple enzymatic modulators such as thrombin-activatable fibrinolysis inhibitor (TAFI) that modifies fibrin to make it more resistant to plasmin breakdown [17]. Younger age, fever and shortness of breath could be observed in patients with dysgeusia symptoms. In addition, the D-dimer level was significantly higher in the dysgeusia group [4]. This suggests that treatments that reduce IL-6 and D-dimer levels might substantially decrease morbidity and mortality in patients on suppressive ART [5]. There is a significant association between the high D-dimer level and severity of COVID-19 among diabetic patients [6]. The higher D-dimer levels provide prognostic information useful for clinicians to early assess COVID-19 patients at risk for disease progression and mortality outcomes [22]. D-Dimer has documented very crucial role in covid-19 pneumonia in predicting severity of illness and assessing response to treatment during hospitalization and follow up titers have significant role in step-up or step-down interventions in critical care setting [16]. Increased levels of serum D-D may be used as an early predictor of RMPP (refractory Mycoplasma Pneumoniae Pneumonia) and the occurrence of complications [7]. The D-dimer be used to screen patients with COVID-19 to evaluate the severity and predict the prognosis and mortality in hospitalized COVID-19 patients during admission and follow-up throughout hospitalization [21]. D-Dimer levels in patients with COVID-19 correlate with outcome, but further studies are needed to see how useful they are in determining prognosis [15]. Elevated D-dimer levels on admission were associated with an increased risk of disease severity and mortality in patients with SARS-CoV-2 infection [14]. Numerous studies identified high D-dimer levels as a biomarker of poor prognosis in hospitalized patients with COVID-19 [2]. The abnormal level of electrolytes is due to renal abnormalities. An association of O₂ saturation exists with ferritin and D-Dimer [1]. There was no publication bias. CRP and D-dimer rose with age in COVID-19 diabetic and non-diabetic patients [18]. Over thirty different D-dimer assays, using more than twenty different types of monoclonal antibodies, are currently commercially available [13]. Regular estimation of these simple coagulation parameters may predict disease severity and help in adequate management [18]. Cancer, and pneumonia were frequently present when ultra-high plasma D-dimer levels were encountered, and mortality was high when the levels were >15,000 ng/mL cancer, and pneumonia were frequently present when ultra-high plasma D-dimer levels were encountered, and mortality was high when the levels were >15,000 ng/mL, [24].

Materials and Methods:

Population study and data collection

The study was applied in the spatial boundaries on the scale of the Derna, of Al-Qubba City and its suburbs, and it was in the temporal boundaries from January 2020 to July 2022, and the following

was a work consisting of a questionnaire containing the demographic characteristics of the participants, Gender, age, heart disease, respiratory disease, surgeries.

Sample collection

- 556 Patients' cases were collected from private and governmental laboratories, isolation and health care centres in the Derna, Al-Qubba City and its surrounding areas.
- 556 Samples were collected from suspected patients and taken using a thin, sterile needle to take a blood sample from a vein 2.7 ml kept in a tube containing 3.2% sodium citrate.
- Preparation of I-Chroma D-Dimer Quantitative kits reagent and Withdrawing 10 microns of plasma and adding it to the detection buffer and withdrawing from the detection buffer insulator package 75 microns and adding it to the cartridge strip.

Measurements:

- Place made : south korea : gangwon , chuncheon at (absorbance at 350 nm), Note the change in the Cartridge Strip and press the "Select" button on the Test Tool to display the digital result on the screen.
- absorbance at (350 nm), Note the change in the Cartridge Strip and press the "Select" button on the Test Tool to display the digital result on the screen.

Statistical analysis:

The data analyzed by SPSS (Statistical Package for the Social Sciences) version 26, Categorical variables were described as frequency rates and percentages, and continuous variables were described using mean and Pearson Correlation(R), qui Squair, P-Value.

Result and discussion

Table (1) is noticeable in that it shows the Frequency & Percent of Gender, 278 (50%) for males, 278 (50%) for female

Table 1: Frequency and Percent of the Gender

Gender	Frequency	Percent%
Male	278	50.0
Female	278	50.0
Total	556	100.0

In Table (2) It can be seen that the Frequency & Percent of Chronic Diseases, the highest percent for Pneumonia 121 (21.8%), followed by Blood Pressure 77 (13.8 %), Diabetes Miletus 51 (9.2%), and other diseases 71 (12.8%).

Table 2: Frequency & Percent of the Chronic Diseases

There are Chronic Diseases	Frequency	Percent%
Anemia Diseases	16	2.9
Blood Pressure	77	13.8
Diabetes Miletus	51	9.2
Heart Disease	27	4.9

Kidney Disease	14	2.5
Others	71	12.8
Pneumonia	121	21.8
There are no diseases	179	32.2
Total	556	100.0

Figure (1) illustrates the Frequency and Percent of Chronic Diseases, the highest percent for Pneumonia 121 (21.8%), followed by Blood Pressure 77 (13.8 %), Diabetes Miletus 51 (9.2%), and for other diseases.

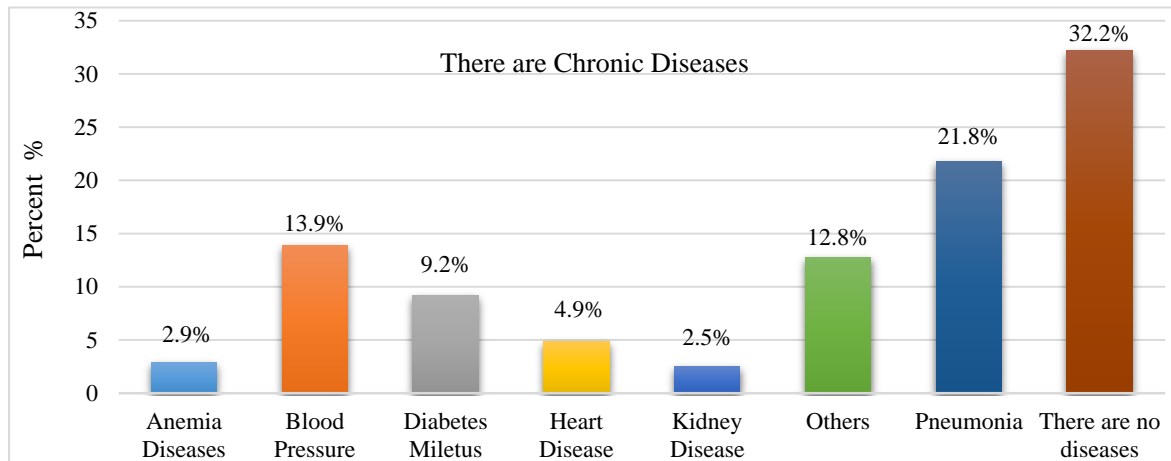


Figure 1: Frequency and Percent of the Chronic Disease

Table (3) illustrates the Frequency & Percent of the Type of infection or others, the highest percent for Viral Infection 498 (89.6%), followed by Surgery 23 (4.1%), Deep Vein Thrombosis 18 (3.2%), and for Respiratory Diseases 17 (3.1%).

Table 3: Frequency and Percent of the Type of infection or others

Type of infection	Frequency	Percent%
Viral Infection	498	89.6
Deep Vein Thrombosis	18	3.2
Respiratory Diseases	17	3.1
Surgery	23	4.1
Total	556	100.0

Table (4) illustrates the Frequency and Percent of the result of D. Dimer which the highest percent for Moderate 247 (44.4%), followed by High 149 (26.8%), 109 (19.6%), and a very high result 51 (9.2%).

Table 4: Frequency and Percent of the result of D. Dimer

D.Dimer Result	Frequency	Percent %
Normal	109	19.6
Moderate	247	44.4
High	149	26.8
Very High	51	9.2
Total	556	100.0

It is apparent from the results in Figure (2) that the Frequency and Percent of the result of D. Dimer which the highest percent for Moderate 247 (44.4%), followed by High 149 (26.8%), 109(19.6%), and very high result 51(9.2%)

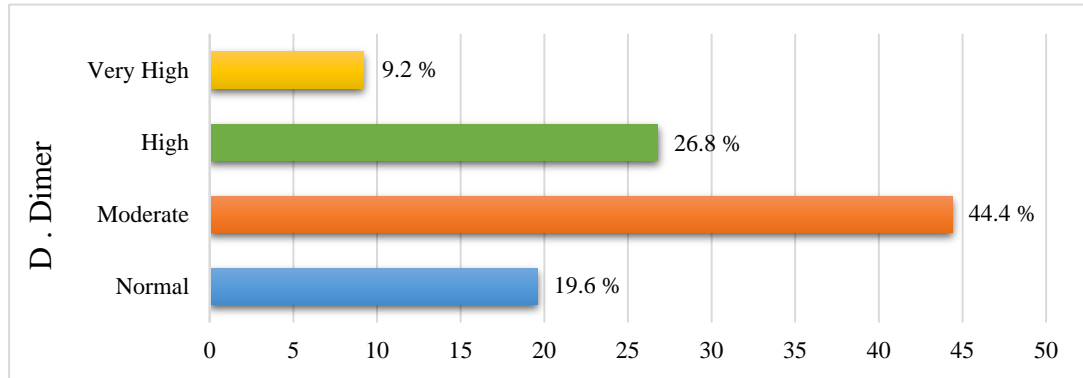


Figure 2: Frequency and Percent of the result of D. Dimer result

Figure (3) It can be seen that the Frequency and Percent of the type of infection, which the highest percent for viral infection 498 (89.6%), followed by Surgery 23(4.1%), Deep Vein Thrombosis 18 (3.2%), and Respiratory Diseases 17 (3.1%).

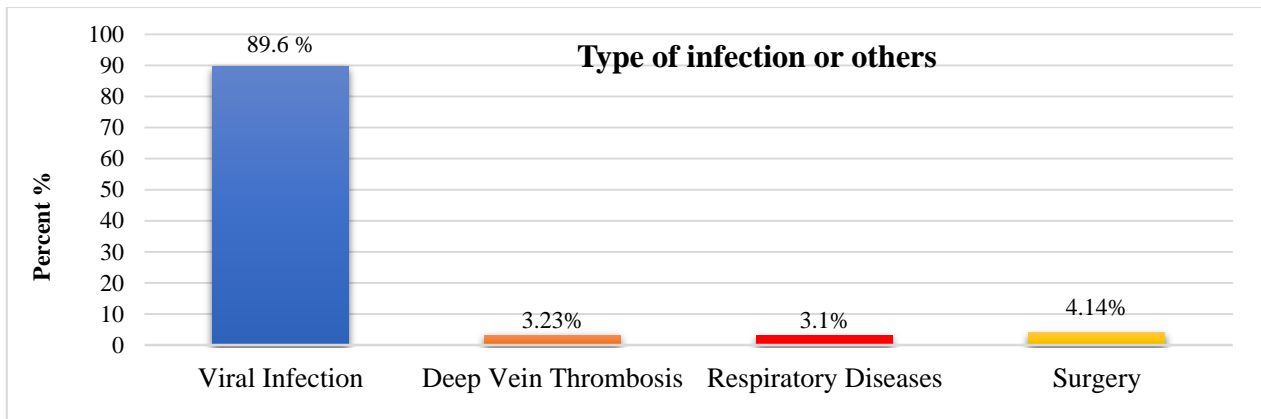


Figure 3: Frequency and Percent of the type of infection

It is apparent from the results in table (5) that the D. Dimer result of Types of infection the highest result was for viral infection (498), followed by Surgery (23), Deep Vein Thrombosis (18), and Respiratory Diseases (17).

Table 5: D. Dimer Result and Type of infection

D. Dimer result of Types of infection	Normal	Moderate	High	Very High	Total
Viral Infection	98	219	135	46	498
Deep Vein Thrombosis	2	9	6	1	18
Respiratory Diseases	5	8	2	2	17
Surgery	4	11	6	2	23
Total	109	247	149	51	556

It is apparent from the results in Figure 4 that the D. Dimer result of Types of infection the highest result was for viral infection (498), followed by Surgery (23), Deep Vein Thrombosis (18), and Respiratory Diseases (17).

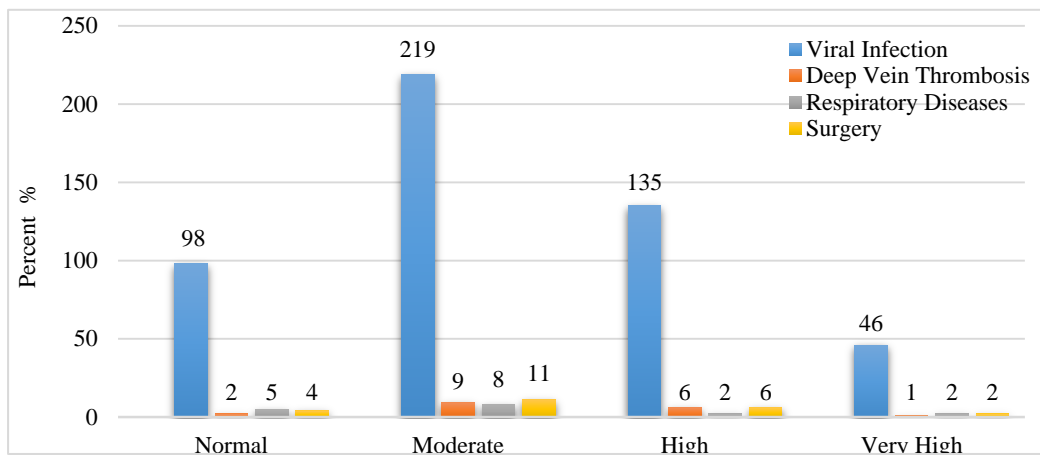


Figure 4: the Cross tabulation of D. Dimer Result and Type of infection

Figure (5) The Figure illustrates the relationship between D. Dimer Result and Chronic Disease that the blood pressure was the highest followed by pneumonia, diabetes Miletus, Anemia, kidney disease, and Heart disease

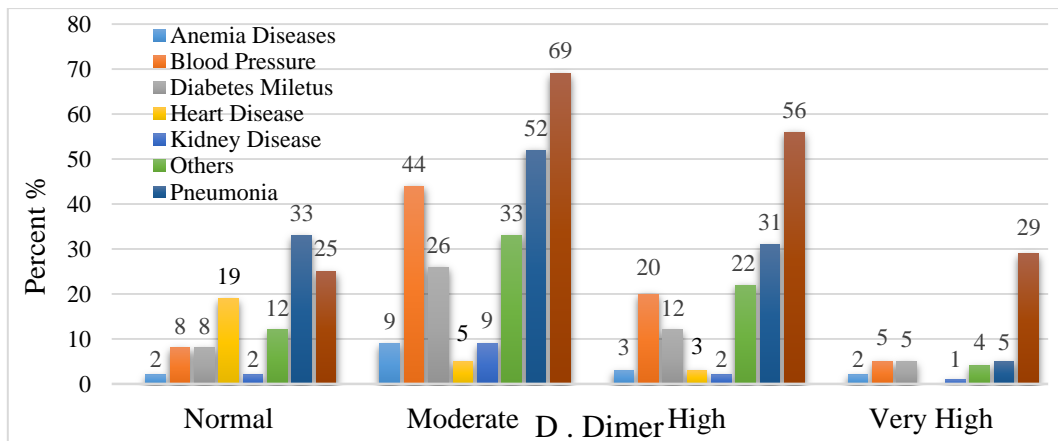


Figure 5: Relationship between D. Dimer Result and Chronic Disease

It is apparent from the results in figure (6) that The Relationship between D. Dimer Result and Gender, male have a higher result than female.

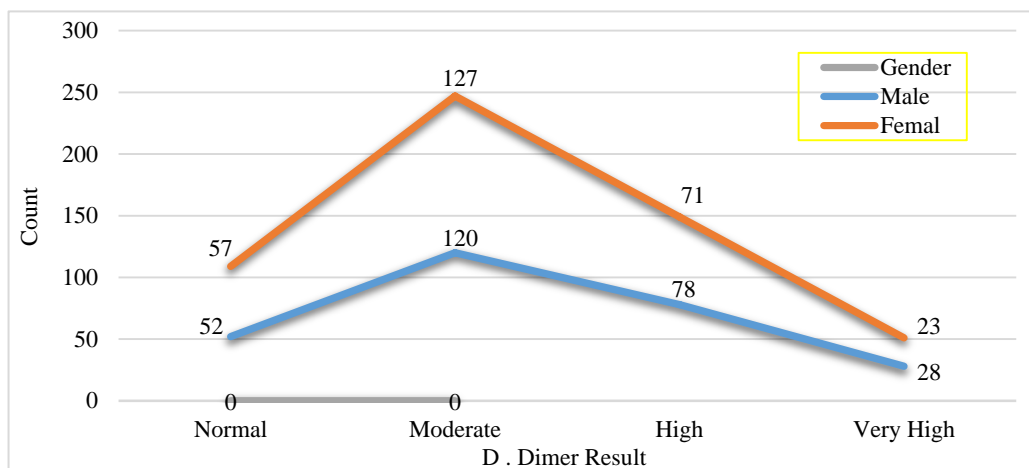


Figure 6: relationship between D. Dimer Result and Gender

The obtained results in a table (6) prove that correlation between D. Dimer, the table noted that there is a relationship between D Dimer and Age and chronic diseases, $p\text{-value} < \alpha = 0.05$, and there is not a significant relationship between D Dimer and Type of infection and gender $p\text{-value} < 0.05$.

Table (6) the correlation between D. Dimer and Type of infection

Correlations		Age	Gender	Chronic Diseases	Type of infection
D. Dimer	Pearson Correlation (R)	-0.193- **	-0.045-	0.083	-0.015-
	P – Value	0.000	0.287	0.050	0.732
	X 2	148.173 b	0.000a	327.942b	1236.417d
	N	556	556	556	556
**. Correlation is significant at the 0.01 level (p-value).					
*. Correlation is significant at the 0.05 level (p-value).					

556 Patients' cases were collected from private and governmental laboratories, isolation and health care centers in the Derna, Al-Qubba City, and its surrounding areas. The study was applied in the spatial boundaries on the scale and its suburbs, and it was in the temporal boundaries from January 2020 to July 2022. It is apparent from the results, in table (1) it is noticeable that show the Frequency & Percent of the Gender, 278 (50%) for male, 278 (50%) for female. In Table (2) it can be seen that the Frequency and Percent of Chronic Diseases, the highest percent for Pneumonia 121 (21.8%), followed by Blood Pressure 77 (13.8%), Diabetes Miletus 51 (9.2%), and other diseases 71 (12.8%). Figure (1) illustrates the Frequency and Percent of Chronic Diseases, the highest percentage for Pneumonia 121 (21.8%), followed by Blood Pressure 77 (13.8%), Diabetes Miletus 51 (9.2%), and for other diseases 71 (12.8%). Table (3) illustrates the Frequency and Percent of the Type of infection or others, the highest percent for Viral Infection 498 (89.6%), followed by Surgery 23 (4.1%), Deep Vein Thrombosis 18 (3.2%), and Respiratory Diseases 17 (3.1%). Table (4) illustrates the Frequency and Percent of the result of D. Dimer which is the highest percent for Moderate 247 (44.4%), followed by High 149 (26.8%), 109 (19.6%), and very high result 51 (9.2%). It is apparent from the results in Figure 2 that the Frequency and Percent of the result of D. Dimer which the highest percent for Moderate 247 (44.4%), followed by High 149 (26.8%),

109 (19.6%), and very high result 51 (9.2%). Figure (3) It can be seen that the Frequency and Percent of the type of infection, which the highest percent for viral infection 498 (89.6%), followed by Surgery 23(4.1%), Deep Vein Thrombosis 18 (3.2%), and Respiratory Diseases 17(3.1%). It is apparent from the results in a table (5) and Figure 4 that the D. Dimer result of Types of infection the highest result was for viral infection (498), followed by Surgery (23), Deep Vein Thrombosis (18), and Respiratory Diseases (17). Figure (5) The Figure illustrates the relationship between D. Dimer Result and Chronic Disease that the blood pressure was the highest followed by pneumonia, diabetes Miletus, Anemia, kidney disease, and Heart disease. It is apparent from the results in figure (6) that The Relationship between D. Dimer Result and Gender is that males have higher results than females. The obtained results in table (6) prove that correlation between D. Dimer, the table noted that there is a relationship between D Dimer and Age & chronic diseases, $p\text{-value} < \alpha = 0.05$, and there is not a significant relationship between D Dimer and Type of infection and gender $p\text{-value} < 0.05$. The obtained results prove that among the results obtained from this study there is a strong relationship between age and chronic diseases and an increase in the level of D-dimer and that D-dimer and an increase in its level in the blood is not an indication of a specific disease, but rather a signal and alert for several diseases. Many diseases, including diabetes, blood pressure, surgeries and bacterial infection of various types of pathogens. The result of this study agrees with many previous studies as [19], [3], [14], [15], [22], [11], [16],

[18], [21], [25], [26], [27] that the D-Dimer indicate to various disease, It is not limited to virus infection only.

Conclusion: The obtained results prove that Among the results obtained from this study There is a strong relationship between age and chronic diseases and an increase in the level of D-dimer, and that D-dimer and an increase in its level in the blood is not an indication of a specific disease, but rather a signal and alert for several diseases, many diseases, including diabetes, blood pressure, surgeries and bacterial infection of various types of pathogens. This study agree with many previous studies

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