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## **Case-control study of thromboembolic events associated with IV immunoglobulin**

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### **BACKGROUND**

#### **Definition**

- **Intravenous Immunoglobulins (IVIg) is a human blood products containing predominantly IgG pooled from thousands donors.**
- **Treatment**
  - **Immunodeficiency**
  - **Autoimmune diseases: Idiopathic thrombocytopenic purpura**  
**Myasthenia gravis**  
**Inflammatory demyelinating polyneuropathy**  
**Systemic lupus erythematosus**

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### BACKGROUND

### Serious Adverse Events of IVIg

- Anaphylaxis
- Renal failure
- Leukocytoclastic skin vasculitis
- Thromboembolic events



The risk factors are still unknown



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### CASE GROUP

All patients received IVIg  
**Individual who developed  
TE (Stroke, MI, PE, DVT)**

19 patients

August 1998-May 2004

During period of IVIg  
infusion or within 2  
weeks after last dose

### CONTROL GROUP

All patients received IVIg  
**Individual who did not  
develop TE**

38 patients.

August 1998-May 2004

During period of IVIg  
infusion or within 2  
weeks after last dose

71 year olds

Trait	Case N = 19 (%)	Control N = 38 (%)	Odds Ratio (95 % CI)	p
Gender (Male)	11 (57.89 %)	23 (60.53 %)	0.90 (0.29, 2.75)	0.85
Race (W)	19 (100 %)	35 (94.6 %)	N/A	
<b>Coronary artery disease</b>	7 (36.84 %)	13 (34.21 %)	1.12 (0.36, 3.54)	0.84
<b>Cigarette use</b>	4 (21.05 %)	4 (10.53 %)	2.27 (0.50, 10.29)	0.28
<b>Hypertension</b>	14 (73.68 %)	26 (68.42 %)	1.29 (0.38, 4.42)	0.68
<b>Cerebrovascular disease</b>	5 (27.78 %)	7 (18.42 %)	1.70 (0.46, 6.36)	0.43
<b>Diabetes</b>	7 (36.84 %)	6 (15.79 %)	3.11 (0.87, 11.15)	0.07
<b>Hyperlipidemia</b>	8 (42.11 %)	11 (28.95 %)	1.79 (0.57, 5.63)	0.32
Deep venous thrombosis	2 (10.53 %)	1 ( 2.63 %)	4.35 (0.37, 51.37)	0.21
Peripheral vascular disease	1 ( 5.26 %)	3 (7.89 %)	0.65 (0.06, 6.68)	0.71
Family history of TE event	9 (47.37 %)	15 (39.47 %)	1.38 (0.45, 4.19)	0.57
Hypercoaguable state	0 (0.0 %)	3 (7.89 %)	N/A	
Monoclonal gammopathy	3 (15.79 %)	3 (7.89 %)	2.19 (0.40, 12.05)	0.36
Obesity	4 (21.05 %)	9 (23.68 %)	0.86 (0.23, 3.26)	0.82
Birth control pill use	0 (0.0 %)	2 (5.26 %)	N/A	
Alcohol abuse	1 (5.26 %)	1 (2.63 %)	2.06 (0.12, 34.78)	0.61
Previous IVIg use	2 (10.53 %)	8 (21.05 %)	0.44 (0.08, 2.32)	0.32
Anti-thrombotic use	8 (42.11 %)	18 (47.37 %)	0.81 (0.27, 2.46)	0.71
30 day mortality	3 (15.79 %)	7 (18.42 %)	0.83 (0.19, 3.65)	0.81

Traits in bold were used in the subsequent cumulative analysis

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**Table 2** Analysis of cumulative cardiovascular risks

No. of risk factors	Case N = 19	Control N = 38	Odds ratio (95 % CI)	p
≥ 1 Risk	16 (84.21 %)	35 (92.11 %)	0.46 (0.08, 2.52)	0.36
≥ 2 Risks	12 (63.16 %)	21 (55.26 %)	1.39 (0.45, 4.30)	0.57
≥ 3 Risks	8 (42.11 %)	9 (23.68 %)	2.34 (0.72, 7.61)	0.15
≥ 4 Risks	7 (36.84 %)	0 (0.0 %)	10.50 (1.91, 57.58)	0.002
≥ 5 Risks	2 (10.53 %)	0 (0.0 %)	N/A	
All 6 Risks	0 (0.0 %)	0 (0.0 %)	N/A	

**Ten-fold  
higher**

*Risks* coronary artery disease, cerebrovascular disease, cigarette use, hypertension, hyperlipidemia, diabetes mellitus

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### **CONCLUSION**

- **Elderly patients receiving IVIg are at moderately risk for developing TE events.**
- **The risk for TE events associated with IVIg increases as the number of CV risk factors.**
- **The mechanisms of TE event associated IVIg are still unknown.**

