

NON-TRADITIONAL RISK FACTORS FOR STROKE

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STROKE PREVENTION PHYSICIAN QUINTE HEALTH CARE

“TRADITIONAL” STROKE RISK FACTORS

- Hypertension
- Diabetes
- Smoking
- High Cholesterol
- Atrial fibrillation
- Overweight
- Inactivity
- Sleep apnea
- Alcohol abuse
- Drug abuse
- Stress and Depression

“NON-TRADITIONAL” STROKE RISK FACTORS

- Cancer
- Air Pollution
- Acute and Chronic Inflammatory and Infectious Diseases
- Stroke in Women: Pregnancy, Contraception, Migraine

CANCER AND STROKE

- Stroke may occur in 15% of cancer patients, with increased severity and mortality compared to non-cancer patients
- Stroke may occur prior to the diagnosis of cancer or years after cancer diagnosis
- Cancer may be a cause of “Cryptogenic Stroke” or “Embolic Stroke of Undetermined Source” (ESUS)
- Cancers with a higher risk of stroke: Lung, Breast and Gastrointestinal
- Higher risk with more advanced cancers

MECHANISMS OF STROKE IN CANCER PATIENTS

1. Tumour release of clot-promoting factors: mucins, tiny particles
2. Tumour emboli
3. Cancer Treatments:
 - Radiation: radiation vasculopathy and atherosclerosis
 - Chemotherapy: Platinum-based therapy, VEGF (vascular endothelial growth factor) inhibitors, tyrosine kinase inhibitors
4. Hormonal Therapies: Tamoxifen (possible)

CANCER AND STROKE

5. Non-Bacterial Thrombotic Endocarditis (Marantic Endocarditis). This is a non-infectious condition that may cause a platelet and fibrin embolic stroke. It is rarely diagnosed during life.
6. Bleeding disorders: Low platelets, anticoagulants and anti-platelet drugs

WHEN TO SUSPECT A HIDDEN CANCER

1. Strokes in multiple territories
 2. Abnormal laboratory tests: D-Dimer, CRP, ESR, Fibrinogen
 3. Clinical suspicion: Older age, weight loss, smoking history
- Note: Hidden or occult cancer is an uncommon cause of cryptogenic stroke, and it is best to reserve CT scans to those with the above characteristics.

AIR POLLUTION AND STROKE

- According to the Global Burden of Disease Study, air pollution is the fourth most common cause of stroke, after hypertension, obesity, and diabetes.
- Air pollution contributes 30% to the risk of stroke
- In Canada, air pollution contributes to 15,300 premature deaths per year (6,600 in Ontario). The total cost is 120 billion dollars or 6% of GDP
- Strong contributor to respiratory disease: 35 million acute respiratory symptom days and 2.7 million asthma symptom days.
- www.airqualityontario.com for air quality health index and www.iqair.com for air quality index

AIR POLLUTION

- PM2.5
 - Particulate matter 2.5 micrometres or less in size
 - 65% of burden of mortality
 - Small enough to gain access to the circulation and contribute to atherosclerotic plaque development
 - Mainly from fuel combustion
 - Myocardial infarction and stroke after both short and long-term exposure
- Ground-level ozone: 26% of burden of mortality
- Nitrogen dioxide: 8% of burden of mortality
- Air Pollution increases risk of dementia, Parkinson Disease, subclinical strokes, vascular mortality

ACUTE AND CHRONIC INFLAMMATORY DISEASES

- Atherosclerosis is a chronic inflammatory disease
- Diseases that increase inflammatory cells and mediators can worsen atherosclerosis
- Acute diseases:
 - COVID-19: Stroke occurs in about 2% of hospitalized COVID-19 patients. This is 7 times greater than the rate in influenza patients.
 - Varicella-Zoster vasculopathy
- Chronic Diseases:
- Psoriasis
 - Increased risk of stroke and myocardial infarction
 - Increased risk factors: hypertension, diabetes, cholesterol, obesity, metabolic syndrome, smoking
 - Decreased life expectancy by 5 years

INFLAMMATORY DISEASES

- Chronic Kidney Disease
- Collagen vascular disease: Rheumatoid arthritis and Systemic Lupus
- Ankylosing spondylitis
- Gout
- HIV-AIDS
- Periodontitis
- Atrial myopathy

WOMEN AND STROKE

- Pregnancy
 - Risk of stroke is 3 times higher during pregnancy and postpartum, but the absolute risk is still low, at 30/100,000 pregnancies
 - Increased risk with hypertensive disorders of pregnancy (also increased long-term risk)
- Combined Oral Contraceptives
 - Avoid in migraine with aura, and migraine without aura over age 35 years.
 - Contra-indicated in smokers over age 35 years or over 15 cigarettes per day, vascular disease, hypertension >160/100, stroke, ischemic heart disease, diabetes with complications
 - Alternatives Mirena IUD, progestin-only pill, depot-progesterone, rod implant

HORMONE REPLACEMENT THERAPY (HRT)

- Women's Health Initiative 2002 changed our approach to hormone replacement
- Post menopausal hormone replacement therapy is considered safe for the first 10 years after menopause
- Small increases in stroke, coronary heart disease, pulmonary emboli, and breast cancer
- Overall absolute risk increase over 5 years: 1%
- Main messages: HRT is effective in reducing menopausal symptoms, but do not use HRT for vascular disease prevention in older women

CONCLUSIONS

- Health Care Professionals need to be aware of diseases and conditions that increase the risk of stroke
- These include cancers and their treatments, acute and chronic exposure to air pollution, acute and chronic inflammatory diseases and HRT, pregnancy and contraception in women.

SELECTED REFERENCES

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- Christensen, H and Bushnell, C: Stroke in Women: Continuum 2020; (2, Cerebrovascular Disease) 363-385
- Dropbox link:
<https://www.dropbox.com/sh/z6lq9gg3sfnr0ne/AAAEBweSNvgHktfRvYn2haRva?dl=0>