Stroke Rehabilitation – Topics & Trends

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Stroke Network of SEO
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Objectives

"This symposium provides an opportunity for HCPs and administrators who work in stroke care to develop and share stroke expertise by:"

- "Learning about **best practice strategies**"…
  - *1) spasticity/hemiplegic shoulder pain & 2) education/transition planning*
- "Leaning about exciting **changes** in our system that **improve patient outcomes**"…
  - *trends: 1) spasticity/ hemiplegic shoulder pain & 2) Family Conference intervention (& others)*
- "Developing a **collaborative network** of health care providers" &
- "Improving **awareness** of **services, programs, and resources** to support"
  - *…facilitate discussion/collaboration in future care around these selected Stroke Rehab topics*

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Part 1: Spasticity

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Spasticity

- **Definition**
  - "motor disorder characterized by a velocity-dependent **increase** in tonic stretch reflexes ('**muscle tone**')…
    - with exaggerated tendon jerks from hyperexcitability of the stretch reflex,
    - as one component of upper motor neuron/UMN syndrome" (Lance, 1980)
- **Presentation**
  - Symptoms: pain/spasms/sleep
  - Signs: resistance to stretch (active & passive), posturing (synergistic patterns), dynamic, clonus…
  - Complications: skin breakdown/infection, ROM/contracture
  - Impact: Functional (ADLs & IADLs) & Rehab/Recovery…assess via Hx & P/E
  - QoL

  (Concurrent Session)

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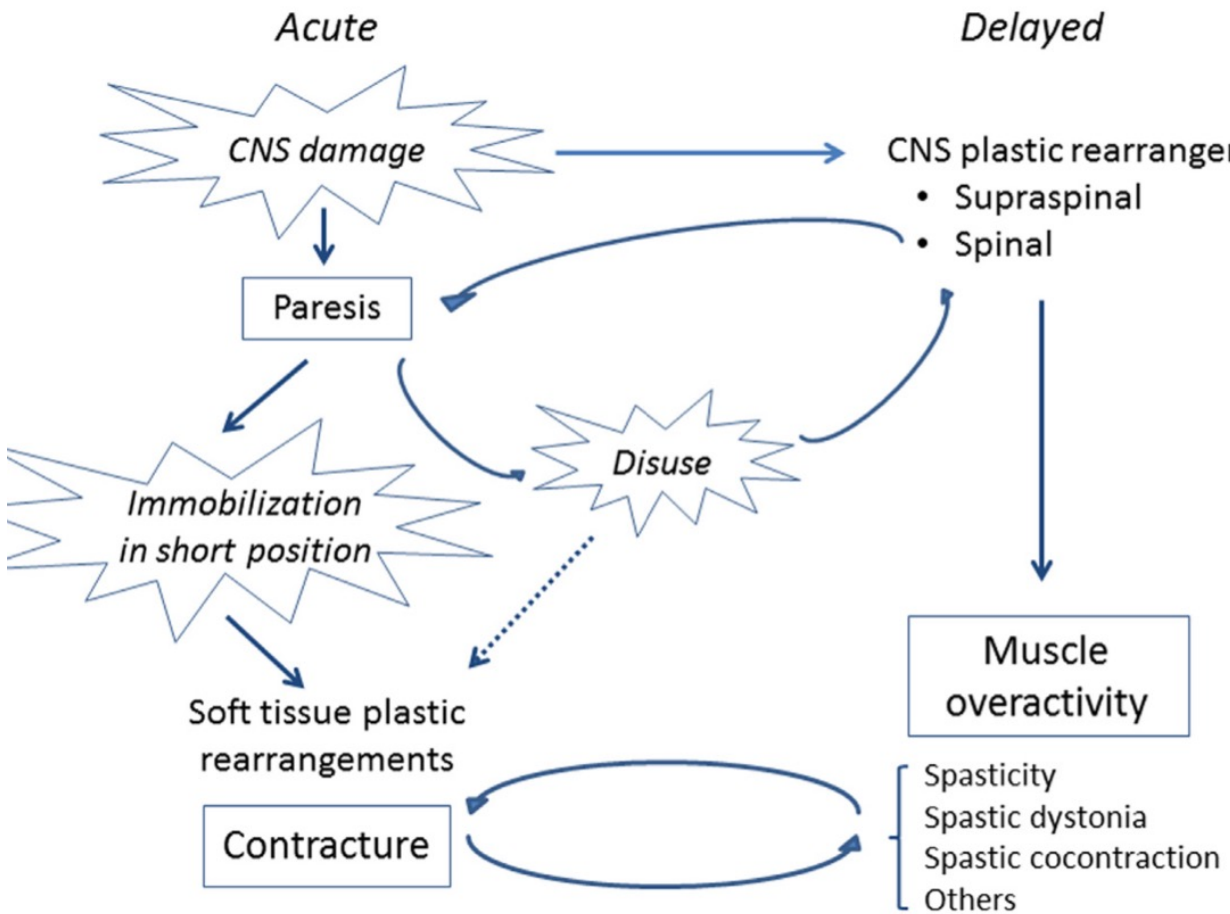

(Wissel et al., 2015)

Pathophysiology of Spastic Paresis

N.B.: *Kwah et al., 2012*

- ~50% = ≥1 joint (@ 6m)
- shoulder (38%) = #1 (moderate-severe stroke)

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Spasticity

IMAGES / VIDEO

- Synergistic **patterns**:
  - Upper Limb (flexor): shoulder adduction/internal rotation, elbow flexion, pronation, wrist flexion, finger flexion
  - Lower limb: knee extension *(or flexion)*, plantar flexion, inversion

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Spasticity

- **Epidemiology** [Zeng et al., 2021: *Meta-analysis (23 studies)]*
  - prevalence ~25%
  - stroke **with paresis** ~40%
  - disabling or severe (spasticity) ~9%
- **Timing** (Zeng et al. 2021)
  - variability in literature (& clinically)
  - overall: within 6 weeks (often within 1 month)
    - *Nam et al., 2019*: median ~1 month; *Balakrishnan et al., 2013*: 1-6 weeks

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Spasticity

- **Risk factors** [*Zeng et al., 2021:* Meta-analysis (23 studies)] ***(TREND)***
  - **hemiparesis**: moderate-severe weakness (MRC <=3)
    - #1/strongest (OR = 6.6, 95% CI 2.6–16.8)
  - type – **hemorrhagic**
  - **sensory** disorder
  - localization (& **size/volume**): **subcortical** (**BG/IC/thalamus**) & insular
  - *NOT proven: age, gender, smoking, HTN, DM2, localization (hemispheric, posterior circulation), Barthel Index (N.B.: individual studies)*
  - Other: previous Hx of stroke *(Wissel et al., 2015)*
- **Take Home**
  - **Assess…repeat** (*esp.: initial 1-1.5 months & if RFs*)…early Dx…

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Spasticity – Management

- **multidisciplinary** (patient/caregivers/interdisciplinary team)

Canadian Stroke Best Practice Recommendations: *(Early <6m, Late >6m)*

- **Therapy/Non-pharm**
  - *Spasticity and contractures may be managed by antispastic pattern **positioning**, **range-of-motion** exercises, and/or stretching (Evidence Levels: Early-Level C; Late-Level C); some patients use of **splints** may be useful and should be considered on an individualized basis (Evidence Level C)*
  - literature = **limitations / heterogeneity**; more needed *(Baricich et al., 2023)*
    - SR x2: may improve outcomes following botulinum toxin injections
    - monotherapy: limitations (e.g. ROM & contractures – *Harvey et al., 2017*)

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Spasticity – Management

- **multidisciplinary** (patient/caregivers/interdisciplinary team)

Canadian Stroke Best Practice Recommendations: (***Early <6m***, *Late >6m)*

- **referral** (physician with knowledge of comprehensive Tx options)
- **Oral pharmacotherapy**
  - *can be considered for the treatment of disabling spasticity, but S/Es of fatigue and drowsiness are common and the benefits appear to be marginal*
- **Chemodenervation (Botulinum Toxin/BoNT)**:
  - *Upper extremity: can be used to increase **ROM** & decrease **pain** (**Early-Level B**; **Late-Level A**)*
  - *Lower extremity: can be used to reduce **spasticity**, increase **ROM**, & improve **gait** (**Early-Level C**; **Late-Level A**)*
    - *caution should be taken when delivering in the early phase while patients are still recovering.*

Other: e.g. surgical

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Spasticity - Management

IMAGES

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‘Early’ Botulinum toxin - *TREND?*

- Definition - ‘**Early**’:
  - no definitive, not always that early…
  - Canadian Stroke BPRs: Early **<6 months** post-stroke; studies (often <3 months)
- Literature:
  - limited (**majority = ‘chronic’ phase** / >6 months-see BPRs Levels of Evidence)
  - *Rosales et al., 2016*: meta-analysis; BoNT Tx within **3m**
    - **↓ tone**, trend towards ↓ reduction in pain; **need added research**: & function/disability
  - *Wissel et al., 2020*: observational, routine-practice study
    - **early-**start (mean **3.7m**) vs. **medium**-start (~20m) vs. **late**-start group (~144m)
    - **all groups ↓ tone**; no significant difference bt groups (trend with early)
  - *Picelli et al., 2021*: multicenter, longitudinal, cohort study, BoNT <12m
    - ↓ tone; **BoNT** start **≤90 days** = lower tone; **need added research** (RCTs)

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‘Perioperative’ Botulinum toxin – *TREND?*

- Concept
  - patients undergo **surgeries** on **spastic limbs**:
    - 1) **related to/Tx of** spasticity & 2) **unrelated** to spasticity (e.g. ortho issues/injuries)
  - spasticity may predispose to **increased** perioperative surgical **complications**
  - surgery = **noxious** stimuli → can **increase spasticity** (intra- & post-op) →
  - ↑ potential effect on **surgical outcomes** (repair, anatomy, wound healing)
  - => optimizing pre-op spasticity could be beneficial
- Evidence
  - SR *(Saeidiborojeni et al., 2020)*: *primarily CP*
    - BoNT injection **pre-op** (not intra-op) can improve **surgical outcomes** (post-op pain, analgesic use, & spasticity)
    - more research warranted
  - stroke: limited (cases / anecdotal)…future

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Spasticity

- Regional Resources / Referrals:
  - → Physical Medicine & Rehabilitation (PM&R/Physiatry) – Providence Care (…Neuro-Rehab - Stroke – RFR: Spasticity - ? botulinum toxin etc.)
    - Inpatient: Kingston, Brockville, Quinte – Stroke teams (& beyond – CC/Psychiatry/Geri)
      - *process for situation*
    - Outpatient: Stroke Prevention Clinics (Kingston, Brockville, Belleville), Primary Care providers (South East region & beyond)
    - Message: if not sure...ask; earlier (vs. chronic/contractures)
  - collaboration:
    - referring team – therapy/nursing/care team (inpatient & community)/primary care

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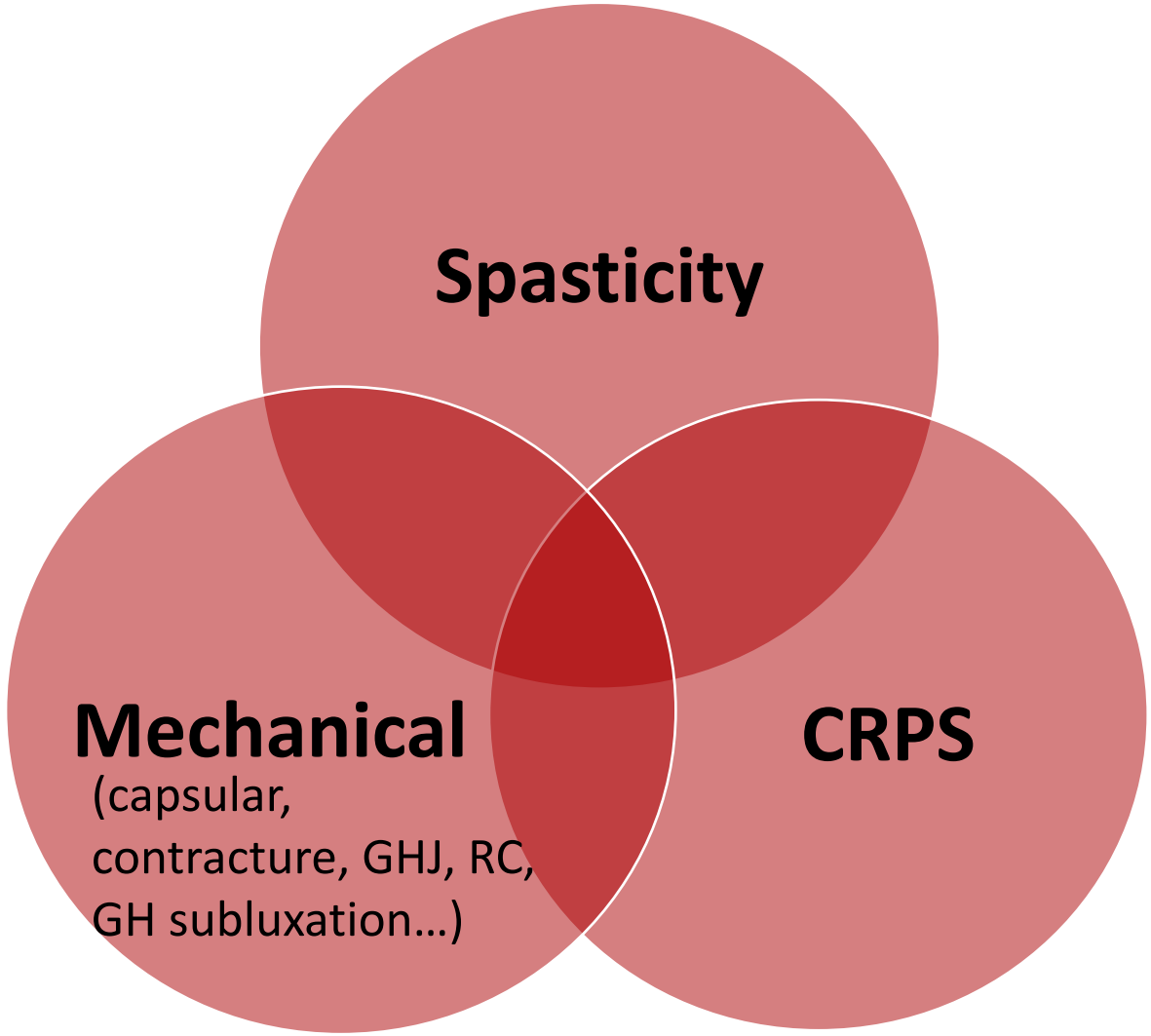
Spasticity in context…Hemiplegic Shoulder Pain



Other:

- pre-existing (e.g. MSK)
- central post-stroke pain
- …

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Hemiplegic Shoulder Pain

- **Epidemiology**: ~30% (up to 70%?)
- **Impact**: arm movement, participation in rehab activities, contracture, hospital LoS, function, & QoL
- **Etiology**: multifactorial (mechanical & neurological)
- **Management**
  - complex, multifaceted
  - 1) **prevention** *(multidisciplinary team: protection/support)*
  - 2) Tx underlying **cause(s)**
    - e.g., BoNT, corticosteroid injection (GH/subacromial), oral corticosteroids, nerve block…

Image

(Concurrent Session)

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Part 2:
Transition Planning/Preparation & Education

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Transitional Planning/Preparation & Education

Recommendations / Canadian Stroke BPRs:

- Section 1: Recommendations on **supporting** people with stroke, their families, and caregivers
  - *1.0* ***Persons*** *with stroke, their* ***families****, and* ***caregivers*** *should be assessed and* ***prepared*** *for* ***transitions*** *between care stages and settings through* ***information sharing****, provision of* ***education****, skills training, psychosocial support, awareness of and* ***assistance in accessing community services and resources*** *(Evidence Level B). Interventions must be* ***person- and family-centered*** *and* ***tailored****… (Evidence Level C)*

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Transitional Planning/Preparation & Education

Recommendations / Canadian Stroke BPRs:

- Section 2: Recommendations on **education** for people with stroke, their families, and caregivers
  - 2.0: Education for people with stroke, their families, and caregivers is an **integral** part of stroke care that should be included as part of all health-care **encounters** and during **transitions** (Evidence Level A).
  - 2.2: Delivery of education
    - **individualized**
    - **cover all relevant aspects** of stroke care and recovery
    - be **goal-oriented** and facilitate **shared decision-making** regarding care & recovery
    - be **interactive**, **evidence-based**, **accurate**
    - **reinforcement** of information
    - **interdisciplinary approach**

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Transitional Planning/Preparation & Education

Recommendations / Canadian Stroke BPRs:

- Section 3: Recommendations on interprofessional **care planning and communication**
  - Transition planning activities include: pre-discharge needs assessment, home visits, **meetings** between the care team with the person with stroke, their families, and caregivers, a post-discharge follow-up **plan**, & **communication** with team **members at the next phase** of care
  - *3.2: **Transition Planning**: (ii) a transition planning process should be established as a **well-organized** collaboration between health professionals, the **person** with stroke, their **family**, & **caregivers** (Evidence Level B).*

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Transitional Planning/Preparation & Education

- **Summary**
  - **transitions** in care = **challenging** post-stroke
  - transition **planning/preparation** & **education** = key
  - **caregivers/carers**: significant contribution to post-stroke recovery & community transition
    - literature:
      - **limitations** in planning/preparation/education (& time)
      - optimal means / interventions: ?...more research needed…
        - concepts noted
      - Family Conference ?...

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Family Conference

- Defn.: **care meeting** involving the patient, their carer(s), & interdisciplinary care team
- Utilization:
  - several healthcare fields (e.g., rehab–including stroke, geriatric medicine, palliative care)
  - enhancing communication; provide updates; help in discharge planning
- Potential beneficial elements:
  - patient- & family-centered; treating patient in context of their support network
  - active, proactive, interactive, individualized (i.e., patient/case-specific), potential for organized approach, & interdisciplinary
  - patient & multiple carers at the same point in time
- Literature/Evidence:
  - impact: paucity of data within specific clinical settings (e.g., stroke / stroke rehab)
  - method/content/timing: no specific guidelines & limited research in stroke
    - *(broader concepts…lack of time to review today☺)*
  - *…study?*

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Family Conference

- Virtual Family Conference (VFC): ?
  - **COVID-19** related **restrictions** (hospital visitors)
    - challenge - carer engagement in education & transition planning/preparation
    - shift March 2020
    - mode: **teleconferencing** (least digital literacy & support/infrastructure)
  - Evidence: ? lack in stroke
    - critical care: pilot study; satisfaction or decision-making (virtual vs. in-person): no differences)
  - Potential benefits:
    - travel, time, cost (e.g., transportation & missed work) – noted potential barriers
  - …study?

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Virtual Family Conference (VFC)

Original Research Article

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The virtual family conference in stroke rehabilitation: Education, preparation, and transition planning

Benjamin R. Ritsma[1], Peter J. Gariscsak[2], Aarti Vyas[3], Sophy Chan-Nguyen[3], and Ramana Appireddy[3]

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Virtual Family Conference

Methods:

- **Intervention**: virtual family conference (**VFC**)
  - who: patient, carer(s), & interdisciplinary rehab team (post-stroke; inpatient rehab)
  - when: (1-2 weeks) prior to community transition
  - how-method: FC protocol & framework (9 primary themes & additional sub-themes)
  - how-mode: teleconferencing
- **Outcome measures:**
  - questionnaires regarding **carer pre- & post-**FC **rated**: (A) stroke-related **knowledge**, (B) **satisfaction** with **information provision**, & (C) **confidence**, **preparedness**, and **stress** associated with community transition
    - *1) Stroke Knowledge and Community Transition Preparedness Questionnaire*
    - *2) Mant et al. Information Satisfaction Questionnaire*
    - *3) Kingston Caregiver Stress Scale*

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Virtual Family Conference

Results:

- **Patient characteristics**: n=48; Table 1
- **Carer characteristics**: n=87
  - relationship to patient: child (45.8%), spouse/partner (27.7%), other family relation (15.7%; sibling, parent, niece/nephew, relative by marriage), friend (10.8%)
  - living with patient (at transition): 41%
- **Organization of community follow-up care**:
  - consistently

Table 1. Baseline patient characteristics.

Baseline characteristics	n (%)
Age, mean (SD)	75.0 (11.6)
Gender	
Male	26 (54.2)
Female	22 (45.8)
Stroke hemisphere	
Right	25 (52.1)
Left	20 (41.7)
Bilateral	3 (6.3)
Stroke type	
Ischemic	39 (81.3)
Hemorrhagic	9 (18.8)
Baseline comorbidities	
Hypertension	41 (85.4)
Diabetes	13 (27.1)
Atrial fibrillation	11 (22.9)
Coronary artery disease	10 (20.8)
Prior stroke	6 (12.5)
Cancer	5 (10.4)
Chronic obstructive pulmonary disease	3 (6.3)
Ischemic stroke acute treatment	
Thrombolysis	9 (18.8)
Thrombectomy	5 (10.4)

B. Discharge outcomes

Discharge destination	**n (%)**
Home	46 (95.8)
Other (non-institutionalized care setting)[b]	2 (4.2)
Discharge follow-up care	**n (%)**
Occupational therapy	48 (100)
Physiotherapy	48 (100)
Nursing visit	45 (93.8)
Personal support worker	29 (60.4)
Speech language pathology	15 (31.3)

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Virtual Family Conference

Results:

- **Pre- & Post-FC carer ratings**
  - significant improvement noted for:
  - A) stroke-related **knowledge**: pertaining to 1) stroke nature/impairments, 2) stroke management/prevention, 3) functional status, & 4) community services
  - B) **satisfaction with information** provided regarding stroke & transition planning, across all assessed topics (causes, prevention, nature, allowances & services post-d/c)
  - C) carer-reported **confidence** & **preparedness** for community transition
  - D) **self-perceived stress** for elements of **caregiving role**

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Virtual Family Conference

Table 3. Pre- and post-family conference carer-rating questionnaires.

	Pre-family conference	n (%)	Post-family conference	n (%)	p value
A. Stroke Knowledge and Transition Preparedness Questionnaire					
1) Overall, what would you say is your level of **knowledge** of your family member/friend's **stroke** (e.g., location/type/cause) and **post-stroke condition/impairments**?	Unaware	3 (3.45)	Unaware	0	.081
	Poor	7 (8.05)	Poor	2 (2.30)	.087
	Low	18 (20.69)	Low	2 (2.30)	<.001
	Mediocre	30 (34.48)	Mediocre	4 (4.60)	<.001
	Good	18 (20.69)	Good	44 (50.57)	<.001
	Excellent	11 (12.64)	Excellent	35 (40.23)	<.001
...					
B. Mant *et al.*[25] Information Satisfaction Questionnaire					
Do you feel you know enough about what a stroke is?	Yes	63 (72.41)	Yes	81 (93.10)	<.001
	No	24 (27.59)	No	6 (6.90)	<.001
Would you like more information about the causes of stroke?	Yes	59 (67.82)	Yes	37 (42.53)	<.001
	No	28 (32.18)	No	50 (57.47)	<.001
Would you like more information about preventing another stroke?	Yes	64 (73.56)	Yes	48 (55.17)	.011
	No	23 (26.44)	No	39 (44.83)	.011
Do you feel you have all the information you want on the causes and nature of stroke?	Yes	46 (52.87)	Yes	65 (74.71)	.003
	No	41 (47.13)	No	22 (25.29)	.003
Do you feel you have all the information you need about allowances and services after your family member were discharged?	Yes	28 (32.94)	Yes	69 (79.31)	<.001
	No	57 (67.06)	No	18 (20.69)	<.001

Virtual Family Conference

Discussion/Conclusions:

- **Limitations:** single-centre design, internal control (vs. true – no FC)
- **Future**: more research (outcomes, perspective-*started*, vs. in-person)
- **Conclusion**:
  - intervention demonstrated efficacy in facilitating 1) carer education & preparation & 2) transition planning
  - illustrating potential benefits of FCs and feasibility of their virtual application in stroke rehabilitative care
  - part of the picture (e.g. CoRP)

Thank you

- Questions?

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