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Carpal tunnel syndrome in older adults

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Abstract

The clinical and electrophysiologic characteristics of carpal tunnel syndrome (CTS) in elderly adults are not well-established. We examined age differences in clinical, functional, and electrophysiologic features in elderly adults referred for evaluation to a neuromuscular service for evaluation of symptoms suggestive of CTS. Of 415 consecutive subjects referred over an 18-month period, 343 met clinical criteria for CTS. There were 158 young (≤ 50 y), 115 middle-aged (51–64 y), and 70 elderly adults (≥ 65 y). There were no age differences in the duration of CTS symptoms, hand function, or presence of autonomic symptoms. The elderly adults had a higher prevalence of thenar weakness and thenar atrophy than younger subjects. Electrophysiologic abnormalities were more common and more severe in the older subjects. Our study shows that although there are no age differences in subjective complaints of CTS, older adults had objective clinical and electrophysiologic evidence of a more severe median nerve entrapment. Our findings suggest that greater attention needs to be paid to objective evidence of CTS severity rather than subjective complaints when evaluating elderly adults presenting for clinical evaluation of CTS.

Keywords

Carpal tunnel syndrome; compression neuropathy; electrophysiology of carpal tunnel syndrome; elderly; median nerve compression

Abbreviations

APB, Abductor pollicis brevis; CI, Confidence interval; CTS, Carpal tunnel syndrome; FSS, Functional status scale; GSS, Global symptom score

Introduction

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy.¹ The few previous population-based studies of CTS suggest a bimodal age distribution with a peak between ages 50–54 years, and a second peak between 75–84 years.⁴ However, clinical features and electrophysiologic characteristics of CTS in older adults, especially in subjects over age 80, are not well established. CTS in older adults is reported to be associated with more thenar muscle wasting, exclusively diurnal paresthesias, and more severe motor and sensory axon loss.¹⁴

Our aim in this study was to define the clinical, functional, and electrophysiologic features of CTS in older adults (≥ 65 years) presenting for evaluation to our electrodiagnostic laboratory, and to compare these findings with middle-aged (51–64 years) and younger adults (≤ 50 years) in this clinic-based sample. Older adults are among the fastest-growing segments of the US

population¹⁵; establishing the clinical and electrophysiologic characteristics of CTS in older adults will help develop specific diagnostic approaches and interventions in this age group.

Methods

Subjects

We prospectively evaluated 415 consecutive patients referred to our neuromuscular service at Montefiore Medical Center for evaluation of symptoms suggestive of CTS over an 18-month period (April 2002 to September 2003). Subjects were mostly referred from outpatient clinics including neurology, medicine, geriatrics, orthopedics, neurosurgery, and hand surgery clinics. CTS was clinically diagnosed, using published criteria,¹ in patients who had focal signs and symptoms, including but not necessarily restricted to a history of nocturnal or activity-related pain and paresthesias in the affected hand, reproduction of paresthesias by provocative maneuvers (such as the Tinel's sign or Phalen's sign), and sensory deficit restricted to the median nerve distribution. Of the 415 subjects evaluated, 72 did not meet the clinical diagnostic criteria for CTS and were excluded. These 72 patients either did not have typical sensory disturbances or had non-sensory symptoms upon presentation such as muscle stiffness or isolated weakness.

Because we wanted to obtain a full spectrum of CTS presentation, we did not exclude subjects with CTS and clinical or electrophysiologic evidence of additional entrapment neuropathies, peripheral neuropathy, or cervical radiculopathy. However, we separately report age differences in our variables of interest in subjects with CTS and no additional nerve involvement.

Using a structured questionnaire, subjects were interviewed at enrollment about their clinical symptoms, previous investigations, and treatments received. They were clinically evaluated by neurologists with specialized expertise in neuromuscular disease. Strength in the abductor pollicis brevis muscle (APB) was rated in both hands using the Medical Research Council scale from 0 (no movement) to 5 (normal power). Thenar atrophy was confirmed on visual inspection and palpation of the muscle.

All subjects gave written informed consent, and the study protocol was approved by the local institutional review board.

Clinical evaluation

We evaluated subjects using the following instruments and procedures to assess presence and severity of CTS. (1) The Global symptom score (GSS), is a composite of five clinical symptoms (pain, numbness, paresthesias, weakness, and nocturnal awakening) rated on a 11-point scale (0 to 10) developed in our laboratory and widely used to quantify CTS severity.^{5,7} The worst score on the GSS is 50. The GSS and the functional status scale were filled out by the subject prior to evaluation by study physicians. (2) The functional status scale (FSS)⁹ of the Boston Questionnaire is a composite of eight activities of daily living measured on a 5-point scale: writing, buttoning clothes, holding a book while reading, gripping a telephone handle, opening jars, household chores, carrying grocery bags, and bathing/dressing. The total score is 40, with higher scores indicating worse function. This is a reproducible, internally consistent, widely used scale, that was chosen due to its applicability in assessing the functional loss associated with CTS.^{6,9,10} (3) Autonomic symptoms. Patients were asked about presence or absence of any of the following autonomic symptoms: swelling, color changes, blanching, or increased dryness in their hands. We have previously reported that such autonomic symptoms are common in CTS.¹⁶

Electrodiagnostic evaluation

Patients underwent electrodiagnostic studies of both hands including median (sensory and motor) and ulnar (sensory and motor) nerve conductions, and needle electromyography of pertinent muscles, including APB. In subjects with clinical features of polyneuropathy or electrophysiologic evidence of both ulnar and median nerve involvement, the nerve conduction studies were expanded to examine other upper- and lower-limb nerves to exclude polyneuropathy. Root screen on needle electromyography was only performed in subjects with clinical features suggestive of cervical root or brachial plexus disease on history or examination. CTS was diagnosed on electrophysiologic studies by the presence of focal slowing exceeding 10 m/s comparing the transcarpal (palm to wrist) median mixed nerve conduction velocity with the distal-segment nerve conduction velocity (palm to second digit)¹³ or an absent sensory response with a prolonged distal motor latency (>4.5 ms). We have reported excellent validity for this diagnostic technique (sensitivity 0.87, specificity 0.98) in a referral sample recruited from the same electrodiagnostic laboratory.¹³ The electrodiagnostic abnormalities were used to corroborate but not assign the diagnosis of CTS in this study. Subjects who met clinical but not electrophysiologic criteria for CTS were not excluded.

Statistical Analysis

Baseline characteristics were compared using descriptive statistics. The clinically more symptomatic limb was used for analyses in cases with bilateral CTS (21%) or the self-reported dominant hand if both hands were equally involved (13%). Distributions were examined, and non-parametric tests were applied as appropriate. All tests were two-tailed. P-values are provided for group comparisons, but in view of the multiple comparisons the level of significance was set at 0.01.

Multivariate logistic regression was used to model the association of clinical and electrophysiologic variables with age (65 years or older) as the dichotomous outcome. Based on previous studies by us and others,^{4,7,8,13,16} we a priori selected clinical symptoms (duration, autonomic symptoms, and sensory symptoms measured by the GSS), clinical signs (thenar atrophy and thenar muscle weakness), and presence of electrophysiologic abnormalities (abnormal median sensory or motor responses) as the independent variables in the model. Covariates included sex (women), height (inches), and handedness (right hand). Odds ratios with 95% CIs are reported for the associations of the variables with age. All analyses were performed using the SPSS version 12.0 statistical software (SPSS Inc., Chicago, IL).

Results

Study population

Of the 343 eligible subjects, there were 158 young (≤ 50 y), 115 middle-aged (51–64 y), and 70 older adults (≥ 65 y). The mean ages of these groups were 40, 56, and 75 years, respectively. There were no differences in self-reported height or weight. There were more men in the older group than the young group, though the difference was not significant (19% vs. 8%, $p=0.04$). The right hand was initially involved in 50% of patients, left hand in 28%, and both hands simultaneously in 21%. The right hand was the more symptomatic in 54% of patients, the left hand in 33%, and involvement was equal in 13%.

Clinical

Table 1 shows no significant difference in the GSS, FSS, duration of symptoms, presence of autonomic features, and prior hand treatments between the three age groups. Treatments either singly or in combination for CTS received by subjects prior to their evaluation included wrist splinting ($n = 140$), medications ($n = 44$), surgery ($n = 13$), and unconventional treatments (n

= 1). Thenar atrophy was related to age, and was seen in 8% of the young group, 33% of the middle-aged group, and 59% of the elderly group. Older age groups were more likely to have thenar weakness. The presence of Tinel's or Phalen's sign was not significantly different between groups.

There were no significant differences in GSS and FSS by age group even when restricted to the 218 subjects with pure CTS without additional nerve involvement. Of the 343 patients with clinical CTS, 86% also met electrophysiologic criteria for CTS.¹³ Requiring both clinical and electrophysiologic abnormalities to define CTS may result in the exclusion of subjects with early or clinically very mild CTS. In support, GSS scores were lower in subjects who met only clinical criteria for CTS compared to those who also had electrophysiologic abnormalities (mean 37.5 ± 9.4 vs. 33.5 ± 10.4 , $p = .001$).

Co-morbid illness

Table 1 shows that osteoarthritis was more common in older adults (46%) than middle-aged (25%, $p < .001$) or young groups (8%, $p < .001$). Diabetes mellitus was also more common in older adults (36%) than middle-aged (22%, $p = .04$) or young patients (11%, $p < .001$). There was no significant difference in the prevalence of chronic renal failure or thyroid disease. One or more additional nerve involvements such as ulnar neuropathy (51), polyneuropathy (29), and cervical radiculopathy (13) were present in 125 subjects. Ulnar entrapments and polyneuropathy were more common in older adults. There was no difference in prevalence of cervical radiculopathy by age group.

Electrophysiology

Table 2 shows that the older adults had significantly more prolonged latencies, reduced response amplitudes, and slowed conduction velocities in both median motor and sensory responses than the young and middle-aged groups. Values for electrophysiologic parameters are reported as medians with interquartile ranges to account for the nonparametric distribution of variables. The median values for sensory responses are zero in Table 3 because sensory responses were absent in the majority of older patients. Hence, age differences were compared using non-parametric tests. The age differences were still significant among age groups when restricted only to subjects who had a sensory response elicited on testing and excluding those with absent responses. However, we did not report summary values in Table 3 excluding subjects with absent responses in the oldest age group as this would result in spuriously higher median values. To corroborate our findings, we also examined median sensory responses as a categorical variable; absent median sensory responses were more common in older adults than middle-aged ($p < .001$) or younger adults ($p < .001$).

The differences in electrophysiologic abnormalities between age groups remained significant even when the analysis was restricted to the 218 subjects with pure CTS. A similar age-related pattern was seen when the analyses was restricted to subjects who met both clinical and electrophysiologic criteria for CTS. For instance, compared to young adults (mean, 5.3 ± 5.1) median sensory amplitudes were lower in middle-aged (3.8 ± 4.3 ; $p = 0.07$) and older adults (1.6 ± 2.8 ; $p < .001$) using nonparametric comparisons.

Sex and CTS

There were more women with CTS than men. There were no differences by sex in GSS in the combined group of subjects or in older adults. However, FSS scores were worse in women than men in the combined group (23.1 ± 7.1 vs. 18.1 ± 8 , $p = .002$). The difference in FSS scores by sex was not significant in the older age group. There were no significant differences by sex in motor or sensory electrophysiologic abnormalities overall or in older adults.

Regression analysis

Multivariate logistic regression modeling provided adjusted odds ratios for estimating the association of clinical and electrophysiologic variables with age (Table 3). The model's internal validity was assessed using the Hosmer–Lemeshow goodness-of-fit test and showed X^2 statistic = 5.89, df = 8, and $p = 0.67$, suggesting that the model is internally valid. Duration of symptoms, GSS, and presence of autonomic symptoms were not significantly associated with age. Older subjects were more likely to have objective weakness of thenar muscles and thenar atrophy. Individual items and overall scores on the GSS were not significantly associated with age. The presence of electrophysiologic abnormalities was associated with old age. Additional adjustment for presence of ulnar or peripheral neuropathy in the full model reduces power, but thenar weakness (OR 3.1, 95% CI 1.6–6.3), thenar atrophy (OR 3.3, 95% CI 1.7–6.3), and electrophysiologic abnormalities were still significantly associated with old age (OR 4.4, 95% CI 1.6–12.1).

Despite the presence of significant age-related differences in clinical presentation of CTS, disease duration was not different between age groups (Table 1). We did secondary analyses to study possible explanations. First, we considered whether older adults under-report CTS symptoms, and present later in the course of the entrapment. If so, older adults would be more likely to have electrophysiologic abnormalities even when clinical severity is mild as electrophysiologic abnormalities indicate more advanced disease. Overall, electrophysiologic abnormalities were present in 60% of subjects with GSS scores < 20, in 73% with GSS scores 21–40, and 83% with GSS > 40. We examined the prevalence of electrophysiologic abnormalities in subjects with mild clinical CTS (GSS < 20). We hypothesized that if older adults underreported their CTS symptoms, they would be more likely to have electrophysiologic abnormalities than younger patients. Electrophysiologic abnormalities were more common in the 18 adults over age 65 with GSS scores < 20 than the 42 subjects below age 65 (OR 3.2, 95% CI 1.2 – 11.1).

It has been suggested that nerve entrapment may advance more rapidly in older adults.⁴ We did not do serial evaluations in our subjects and cannot directly measure progression of CTS. However, if the disease does progress more rapidly in them, older adults with short duration of symptoms might be expected to have evidence of worse entrapment (defined as above by the presence of electrophysiologic abnormalities). The 43 older adults with short CTS duration (< 6 months) had an increased risk of having electrophysiologic abnormalities compared to the 105 subjects younger than 65 years (OR 8.2, 95% CI 2.7–24.6). These findings suggest that older adults most likely not only under-report their symptoms but also have rapid progression of CTS compared to younger adults.

Discussion

This study shows that older adults with CTS present with more severe nerve entrapment than younger adults in terms of muscle weakness, muscle wasting, and electrophysiologic abnormalities on nerve conduction studies, yet have no differences in subjective clinical symptoms or hand function. The age differences in clinical and electrophysiologic CTS parameters were unchanged when the analyses were restricted to subjects with pure CTS, suggesting that a higher prevalence of additional nerve involvement in the older age groups does not completely account for our reported associations. These findings suggest that greater attention needs to be paid to objective evidence of CTS severity rather than subjective complaints when evaluating older adults with CTS.

The correlation between age and clinical presentation of CTS has not been clearly defined in previous studies. One study found nocturnal paresthesias and a shorter duration of symptoms more commonly in patients over 70 years old,¹⁴ and offered the following explanations for an

increase of CTS in the elderly: increased life expectancy in western countries, better medical scrutiny of the elderly, better knowledge of CTS by medical professionals, and more frequent use and improved reliability of electrodiagnostic studies. Another study found a positive correlation between age and severity of hand function, but not between age and severity of symptoms.¹² In contrast, we did not find any correlation between hand functioning or hand symptoms with age. Since older adults in our study had more thenar atrophy and weakness, it is interesting that subjective hand function is also not worse in this group. Our regression analyses were adjusted for height but not weight as information on the latter was missing in many subjects. However a recent study in another large referral sample reported that increased body mass index was a risk factor for CTS in young but not older adults.³ Our secondary analyses showed that electrophysiologic abnormalities consistent with CTS were 3.2 times more common in patients over age 65 with mild CTS symptoms than in younger patients, suggesting that older adults have worse hand function but may be under-reporting these symptoms.

Our study revealed differences in all electrophysiologic parameters in older adults, who had more prolonged distal latencies, reduced response amplitudes, and slowed conduction velocities in both median motor and sensory studies. There were also more patients with absent sensory potentials in the older group. There were no differences in the amount of active denervation in the older group. Our findings are consistent with previous studies that found worsening electrophysiologic changes with increasing age.^{8,14} A previous study reported that CTS may even progress more rapidly in the elderly population.⁴ We found similar results in our subgroup analysis, which may explain in part the worse entrapment seen in older adults. Older adults with short duration of CTS (<6 months) in our study had an 8.2 times increased risk of having electrophysiologic abnormalities compared to patients under age 65.

The strengths of this study include the large prospectively collected sample with systematic assessments utilizing validated questionnaires and techniques. Electrophysiologic studies were performed following well-established protocols. Our findings are based on a referral sample and need to be replicated in population-based samples. However, most clinical encounters for evaluation of CTS occur in clinical settings, and our findings have relevance in formulating clinical approaches for older adults with CTS presenting for medical attention. There was a higher prevalence of women in all age groups, which reflects our referral patterns. A higher prevalence of women with CTS, albeit lower than our study, has also been noted in population-based studies.² Although we included subjects with additional nerve involvements in our analysis to obtain the full spectrum of CTS, restricting our analyses to subjects with pure CTS without additional nerve involvements did not change our main findings. Also, while our study procedures are well established, diagnostic misclassification may underestimate the effect of additional nerve involvement on CTS presentation. We used widely used clinical criteria to define CTS.¹ However, the age-related electrophysiologic differences still persisted when restricted to subjects with both clinical and electrophysiologic evidence of CTS (86% of sample). Our subgroup analyses to explain age-related differences with similar duration of symptoms should be considered exploratory and studied further.

As the population ages, it is likely that we will increasingly see older adults in clinical practice with either hand complaints or discover abnormalities during routine evaluations. A better understanding of the features of CTS in older adults will allow for improved diagnosis and treatment. Although older adults in this series presented with more severe disease, other studies have reported that clinical improvement can occur with carpal tunnel release surgery even in advanced cases in older adults.^{4,11}

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References

1. American Academy of Neurology. Practice parameter for carpal tunnel syndrome (Summary statement). *Neurology* 1993;43:2406–2409. [PubMed: 8232968]
2. Atroshi I, Gummesson C, Johnsson R, Ornstein E, Ranstam J, Rosen I. Prevalence of carpal tunnel syndrome in a general population. *JAMA* 1999;282:153–158. [PubMed: 10411196]
3. Bland JDP. The relationship of obesity, age, and carpal tunnel syndrome: more complex than was thought? *Muscle Nerve* 2005;32:527–532. [PubMed: 16025527]
4. Bland JDP, Rudolfer SM. Clinical surveillance of carpal tunnel syndrome in two areas of the United Kingdom, 1991–2001. *J Neurol Neurosurg Psychiatry* 2003;74:1674–1679. [PubMed: 14638888]
5. Chang MH, Ger LP, Hsieh PF, Huang SY. A randomized clinical trial of oral steroids in the treatment of carpal tunnel syndrome: a long term follow up. *J Neurol Neurosurg Psychiatry* 2002;73:710–714. [PubMed: 12438475]
6. Greenslade JR, Mehta RL, Belward P, Warwick DJ. Dash and Boston questionnaire assessment of carpal tunnel syndrome outcome: what is the responsiveness of an outcome questionnaire? *Hand Surg [Br]* 2004;29:159–164.
7. Herskovitz S, Berger AR, Lipton RB. Low-dose, short term oral prednisone in the treatment of carpal tunnel syndrome. *Neurology* 1995;45:1923–1925. [PubMed: 7477994]
8. Kouyoumdjian JA. Carpal tunnel syndrome. Age, nerve conduction severity and duration of symptomatology *Arq Neuropsiquiatr* 1999;57:382–386.
9. Levine DW, Simmons BP, Koris MJ, Daltroy LH, Hohl GG, Fossel AH, et al. A self-administered questionnaire for the assessment of severity of symptoms and functional status in carpal tunnel syndrome. *J Bone Joint Surg* 1993;75:1585–1592. [PubMed: 8245050]
10. Mondelli M, Padua L, Reale F, Signorini AM, Romano C. Outcome of surgical release among diabetics with carpal tunnel syndrome. *Arch Phys Med Rehabil* 2004;85:7–13. [PubMed: 14970961]
11. Mondelli M, Reale F, Padua R, Aprile I, Padua L. Clinical and neurphysiological outcome of surgery in extreme carpal tunnel syndrome. *Clin Neurophysiol* 2001;112:1237–1242. [PubMed: 11516735]
12. Padua L, Padua R, Lo Monaco M, Aprile I, Tonali P. Multiperspective assessment of carpal tunnel syndrome: a multicenter study. *Italian CTS Study Group Neurology* 1999;53:1654–1659.
13. Scelsa SN, Herskovitz S, Bieri P, Berger AR. Median mixed and sensory nerve conduction studies in carpal tunnel syndrome. *Electroencephalogr Clin Neurophysiol* 1998;109:268–273. [PubMed: 9741794]
14. Seror P. Carpal tunnel syndrome in the elderly "Beware of severe cases". *Ann Chir Main Memb Super* 1991;10:217–225. [PubMed: 1718356]
15. U.S. Department of Health and Human Services, Center for Disease Control, National Center for Health Statistics (2000). <http://www.cdc.gov/nchs/datawh.htm> Accessed November 21, 2005.
16. Verghese J, Galanopoulou AS, Herskovitz S. Autonomic dysfunction in idiopathic carpal tunnel syndrome. *Muscle Nerve* 2000;23:1209–1213. [PubMed: 10918257]

Table 1

Clinical Features *

Variable	A Age ≤50	B Age 51–64	C Age ≥65	p-value C-A	p-value C-B
N	158	115	70		
		Clinical features			
GSS (0–50)	36	37	36	1.00	0.79
FSS (0–40)	25	26	26	0.88	0.99
Duration (months)	23±37	34±43	29±51	0.64	0.77
Any autonomic, n (%)	79 (50)	60 (52)	32 (46)	0.81	0.42
Received treatment, n (%)	89 (56)	58 (50)	32 (46)	0.13	0.43
Tinel's sign, n (%)	56 (35)	43 (37)	30 (43)	0.31	0.54
Phalen's sign, n (%)	59 (37)	53 (46)	26 (37)	1.00	0.28
Thenar atrophy, n (%)	12 (8)	38 (33)	41 (59)	<0.001	0.001
APB weakness, n (%)	41 (26)	52 (45)	50 (71)	<0.001	0.004
		Medical conditions **			
Osteoarthritis, n (%)	13 (8)	29 (25)	32 (46)	<0.001	0.006
Ulnar neuropathy, n (%)	18 (3)	15 (8)	18 (22)	0.01	0.05
Peripheral neuropathy, n (%)	4 (3)	9 (8)	16 (22)	<0.001	0.005

* Values in parenthesis are percentages rounded up.

** There were no significant differences between the age groups in the prevalence of chronic renal failure, thyroid illness, diabetes, and cervical radiculopathy.

APB, Abductor pollicis brevis; FSS, Functional status scale; GSS, global symptom score

Table 2

Electrophysiologic Features. *

Variables	A Age ≤50	B Age 51–64	C Age ≥65	P value C-A	P value C-B
Median motor (Wrist-APB)					
Latency (ms)	4.05 (3.43 – 5.71)	4.6 (3.7–6.3)	5.6 (4.2–8.1)	<0.001	.004
Amplitude (mV)	10.7 (8.2–13.3)	10.9 (6.9–12.4)	6.4 (4.2 – 10.1)	<0.001	<0.001
CV (m/s)	55.2 (52.5–58.3)	54.1 (50.7–56.7)	48.9 (43.2–54)	<0.001	<0.001
Median sensory (D2-Wrist)					
Latency (ms)	2.8 (2.3–3.2)	2.8 (0– 3.5)	0 (0–2.9) [†]	<0.001	<0.001
Amplitude (μV)	6.9 (3.1–11.5)	4.5 (0–8.1)	0 (0–4.4) [†]	<0.001	<0.001
CV (m/s)	42.3 (29.6–50.1)	38 (0–46.3)	0 (0–35.5) [†]	<0.001	<0.001

* All values are medians with interquartile range (25th–75th percentile). Associations examined with Mann-Whitney U-test.

[†] Median values are zero due to high prevalence of absent responses (see Results for further discussion).

APB, Abductor pollicis brevis; CV, Conduction velocity.

Table 3

Multivariate logistic regression model of the association of clinical and electrophysiologic variables with age (>65 years), adjusted for sex (women), height (inches), and handedness (right).

Variables	OR	95%CI	p-value
Duration of symptoms (months)	0.99	0.99–1.01	0.73
Presence of autonomic symptoms	0.69	0.36–1.30	0.25
Any APB weakness (MRC<5)	3.31	1.66–6.61	0.001
Presence of thenar atrophy	3.46	1.78–6.75	<0.001
Global Symptom Score (range 0–50)	0.98	0.95–1.01	0.26
Any electrophysiologic abnormality (Median motor & sensory)	5.52	1.99–15.29	0.001

APB, Abductor pollicis brevis; MRC, Medical Research Council