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Nork Marash Medical Center

*Aspirin and Statin Use in the NMMC
Adult Cardiology Clinic*

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Summary

Objectives

The study monitored two performance indicators in the outpatient adult cardiology clinic (ACC) at the Nork Marash Medical Center (NMMC), namely appropriate prescription of aspirin and statins to ischemic heart disease (IHD) patients.

Methods

A cross-sectional survey of 160 patients with confirmed IHD was conducted by reviewing their medical record forms including Structured Encounter Forms (SEFs) for primary, secondary and postsurgical/postinterventional visits, laboratory test results, and discharge summary.

Results

Only 36.9 % of cases were prescribed a lipid profile tests and/or had test results. Only 28.1 % of the records had lab test results for cholesterol and 23.8% for the whole lipid profile. Statins were prescribed to only 5% of IHD patients in the clinic. The positive predictive value of statins prescription for hypercholesterolemia was 25%, whereas the negative predictive value was 9.8 %. Aspirin was prescribed to 74 % of IHD patients. Poor recording of data (missing and inconsistent data) in the medical records limit the validity of the study.

Conclusions

Data recording should be improved in the clinic by introducing changes in SEFs and by physician training as part of routine quality assurance reviews. Aspirin use for IHD patients was widely accepted practice for ACC physicians, while the statin use was lower than expected. Possible reasons include the expensiveness of these drugs and differing criteria for their prescription. Statin practice in the ACC should be revised through creation and implementation of standardized guidelines.

Introduction

Quality indicators monitoring in Adult Cardiology Clinic (ACC) is a component of AUA/NMMC collaborative project.

A key step in quality improvement is assessment of the current state of quality. According to Donabedian, the first step of the quality improvement cycle is "obtaining data on performance"(1). The treatment prescribed to patients is an important performance indicator in ACC. Ischemic heart disease (IHD) patients compose a significant part (37%) of all ACC patients. "Secondary prevention in ischemic heart disease improves survival, reduces recurrent cardiac events, improves quality of life and is cost-effective" (2). "Statins significantly reduce the risk of heart attack and stroke," said American Heart Association (AHA) President David Faxon, MD. "Overall, multiple large studies have found that statins significantly reduce the risk of death in patients with heart disease by as much as 30 percent" (3). According to the Antiplatelet Therapy Trialists' Study, aspirin reduces vascular deaths by 17%, reinfarctions by 34%, and non fatal strokes by 30% in patients with unstable angina, post myocardial infarction, post stroke, and TIA (4). Despite convincing evidence of the effectiveness of secondary prevention, studies in different regions indicate that a significant number of IHD patients who had indications for cardioprotective medications (aspirin, statins, beta-blockers, ACE-inhibitors) did not receive them (2).

The present study explored the practice of ACC physicians in prescribing cardioprotective medication, namely aspirin and statins, to IHD patients. Aspirin was selected because it is a first choice drug for all IHD patients unless specific contraindications (active peptic ulcer, allergy to aspirin) exist (4). Statins are indicated to IHD patients with hypercholesterolemia, except those with liver diseases (8). In contrast to aspirin, the clinical evidence of effectiveness of statins is more novel (5, 6, 7). The use of statins is limited, according to "Drugs and therapeutic bulletin": only 30 % of IHD patients with elevated serum lipid levels receive lipid-lowering therapy and of those in fewer than 50% of patients target cholesterol level are achieved (8). There are different guidelines for prescription of statins and they vary significantly (7). Taking into account the diversity of statin practice, it was important to study their use in ACC as well.

Study objectives

The specific objectives of the study were:

- to identify the proportion of IHD patients prescribed laboratory tests and proportion of patients with test results,
- to identify the proportion of IHD patient with elevated serum cholesterol levels prescribed statins,
- to identify the proportion of IHD patients prescribed aspirin.

Secondary objective of the study was assessment of the completeness of medical records for the subjects of concern.

Methods

A cross-sectional survey of 160 medical records was implemented. The sample size of the study was determined using one-sample proportion formula and increased for the planned analysis.

All records of IHD patients' recently (May/ June) visited ACC were reviewed. Patient information was abstracted from the computerized database of the clinic by the date of their visit. The medical records were retrieved and examined. Those lacking a confirmed diagnosis were excluded from the analysis. The records of patients, with primary visit standard encountered forms of former version, lacking necessary information, were also excluded. The following data was obtained from the records.

- Consequent number of the SEF of primary visit
- Type of last visit (primary, secondary, postsurgical /postinterventional)
- Prescriptions (lipid profile lab tests, drugs)
- Laboratory test results
- Allergy to drugs
- Gastrointestinal diseases (peptic ulcer, liver diseases)

ACC cardiologists were involved in the design of the study instrument. Based on their suggestion the study instrument was developed. The instrument was pre tested on 10 records. Some changes were made to facilitate data collection process.

The answers to the items of instrument were generally classified in the same way as in SEFs, except for ambiguous responses where separate coding was used. The pretest revealed that for "hypercholesterolemia" item of SEF besides positive, negative and unmentioned answers, physicians often put a question mark, which was classified as a separate answer.

The prescription of cholesterol/lipid profile test was classified as positive if any of the forms (SEF of primary visit, secondary visit, postsurgical visit, discharge summary) included in the folder of patient contained a note of prescribing cholesterol/lipid profile test and/or laboratory test result sheet. The prescription of cholesterol/lipid profile tests was classified as negative if parallel to prescription of other examinations/tests there was no note found on laboratory test prescription. The item was classified as unmentioned if no note of any examinations/tests was found in the "Assigned tests/medications/consultations" part of the form.

Prescription of aspirin was judged as positive if primary visit and/or secondary visit form and/or discharge summary contained physician note prescribing aspirin, as negative if among other prescribed drugs aspirin wasn't found, and as unmentioned if above mentioned documents didn't contain notes of any drugs prescribed in the "Prescribed medications" part of the forms, or there was a note of "Drug treatment" in the discharge summary but the medications weren't specified. The same system was used to classify statin prescription.

Data analysis

The data was entered and analyzed using SPSS 10.0 statistical.

Results

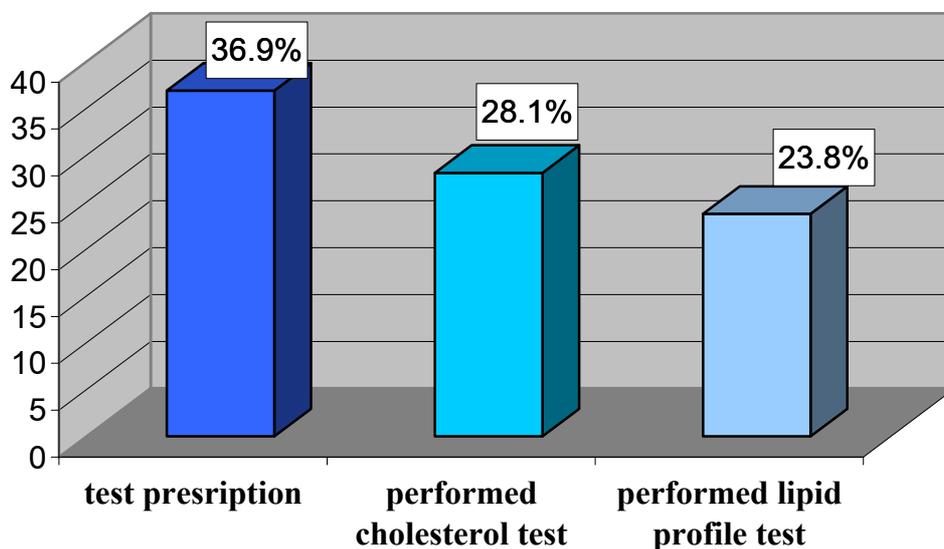
Data analysis revealed that 36.9% SEFs of IHD patients contained note of cholesterol/lipid profile test prescription and /or laboratory test results, 50 % of forms among other prescribed examinations and tests had no note on lipid profile test prescription, and 13.1% of forms had no any note in the " Assigned tests/medications/consultations " field (Table 1).

Table 1. Prescription of lipid profile tests

	Frequency	Percent
Yes	59	36.9
No	80	50.0
Unmentioned	21	13.1
Total	160	100.0

An order for a lab test in the chart is not the same as having the lab test actually run. In some cases results were found where no order was noted and results were missing where an order was found. Only 28.1% of all cases performed laboratory test for total cholesterol, and 23.8% of all cases performed the whole lipid profile test (Figure 1):

Figure 1 Difference between prescription of tests and their actual performance



Of the 28.1% of patients with cholesterol results, 31.1 % had normal serum cholesterol levels, while 68.9% had hypercholesterolemia (Table 2). Total cholesterol levels of 5.2 mmol/l or less were considered as normal, levels higher than 5.2 mmol/l were considered as hypercholesterolemia (7).

Table 2. Lab. test results for total cholesterol

Total cholesterol	Frequency	Percent
Normal	14	31.1
Hypercholesterolemia	31	68.9
Total	45	100.0

Laboratory test results and physician notes to "hypercholesterolemia" item in SEFs assumed to be equivalent, but various contradictions were seen (Table 3).

Table 3. The comparison of physician notes and lab test results

hypercholesterolemia Physician note	Laboratory test results			Total
	positive	negative	no test results	
yes	8	3	6	17
no	7	4	30	41
?	5	2	22	29
unmentioned	11	5	57	73
Total	31	14	115	160

There was a trend for physicians to mention negative answers - 41/17, whereas in reality the number of patients with hypercholesterolemia was almost two times higher (31/14) than the number of patients with normal serum cholesterol levels (Table 3).

The percent agreement of physicians' notes and laboratory test results was 56.9%. The positive predictive value of physicians' notes (PPV) was 47%, and negative predictive value (NPV) of physicians' notes was 9.8.

Out of 160 IHD patients' records, only 8 (5 %) contained a note prescribing statin (Table 4).

Table 4. Statin prescription practice in ACC

	Frequency	Percent
yes	8	5.0
no	122	76.2
unmentioned	30	18.8
Total	160	100.0

The hypothesized proportion of statin prescription in 50% of all cases was rejected ($p < 0.000$).

According to the data physicians, who prescribe statins, not always set up on laboratory test results (Table 5).

Table 5. Statin prescription and laboratory test results

Statin prescription	Lab. test results for total serum cholesterol			Total
	Positive	Negative	No test results	
yes	2	1	5	8
no	22	12	88	122
unmentioned	7	1	22	30
Total	31	14	115	160

The PPV of statin prescription for those with hypercholesterolemia was 25%. The NPV of statin prescription was 9.8%.

Aspirin was prescribed to 74.4 % of IHD patients in ACC (Table 6).

Table 6. Aspirin prescription practice in ACC

	Frequency	Percent
yes	119	74.4
no	11	6.9
Unmentioned	30	18.8
Total	160	100.0

The hypothesized value of 50 % prescription for all cases was rejected ($p < 0.000$).

In case of exclusion of patients with contraindications to aspirin use (active peptic ulcer, allergy to aspirin) and patients with unmentioned treatment the proportion of aspirin prescription increases to 96% (Table 7 & 8).

Table 7. The possible reasons for not prescribing aspirin

Active peptic ulcer	Allergy to aspirin	The only prescription angiography	Other forms with unmentioned treatment
5	1	15	18
3.1%	0.6 %	9.4%	12.9%

Table 8. Aspirin prescription taking in to account contraindications and poor recording

Aspirin prescription	Frequency	Percent
Yes	117	95.9
No	5	4.1
Total	122	100

According to the data, aspirin prescription was higher in secondary/post-surgical patients' records. The proportion of records with unmentioned treatment was also higher for primary visits. This trend could be explained by the way the data was collected, when any note of prescription in any of the forms included in the folder of patient was considered as a positive answer. Thus, the chance for containing a note of prescription was higher for the patients' records, which included several forms versus one (Table 9).

Table 9. Aspirin prescription by visit (the patients with contraindications are excluded)

	Aspirin prescription			
	yes	no	unmentioned	total
primary	52	6	22	80
secondary	16	0	0	16
postsurgical/postinterventional	50	1	7	58
Total	118	7	29	154

Deficiencies in recording data at ACC

Medical record review at ACC showed that some items were recorded better than others. "Drug allergy" was recorded in the majority (90%) of primary visit forms, whereas "gastrointestinal diseases" were recorded only in 81% of forms. The "hypercholesterolemia"

item was not recorded in almost the half of the reviewed forms. "Use of cholesterol and saturated fats" was not recorded in any of 160 forms. In 19 % of forms in "Prescribed medications" subitem, there was no note of any drug prescribed, including 9.4 % of forms where in "Assigned tests/medications/consultations" item there was only a check mark for angiography test.

The present study does not permit to assess the validity of recorded information. Only for "hypercholesterolemia" there was a laboratory test result sheet, which showed that recorded data was often not valid (see above).

Study limitations

The major limitation of the study was poor recording in ACC. For some items the proportion of unrecorded forms reached 100%. Poor recording limited the validity of results of this study, especially as the study didn't allow measurement in validity.

Another limitation of the study was that the study design did not allow measuring the validity of physician/nurse records. The study also did not assess the appropriateness of drug choice, their dosage, test prescriptions, etc.

The practice of counting physician note prescribing medication or test in any of the forms was somewhat generous.

Discussion

The proportion of IHD patients prescribed aspirin in ACC was rather high even compared to the practice in Western countries (65% reported by Antiplatelet Trialists Collaboration study and 85% reported by ASPIRE study) (4). Under recording of aspirin use is possible. In reality aspirin could be prescribed but not recorded. It could be assumed that aspirin use for IHD patients is widely accepted practice for ACC physicians; with some exceptions a part of which could be explained by poor recording, the other part needs deeper exploration.

The study results showed that statin use in ACC is low (8 patients' records out of 160, 7 of which prescribed by the same physician). Statin use is far low compared to the one mentioned by "Drug and Therapeutics Bulletin" (30% of patients with hypercholesterolemia got statins and only in 50 % of those normal serum cholesterol levels were achieved) (8). According to the data, cardiologists rarely base prescription on laboratory test results while prescribing statins (only in 25% cases), and even more rarely when not prescribing statins (9.8% cases). Statin practice is not completely adopted at ACC. Statin use should be reviewed by ACC cardiologists through creation and implementation of guidelines.

One of the possible reasons for low statin use is high price of these drugs (cost of treatment - \$30-\$50 per month). According to cardiologists, many patients mention that they cannot afford buying these medications. Underrecording of statin use is also possible. The accepted practice in ACC for patients with hypercholesterolemia is prescription of long-term (1-2 months) low-fat diet. So, it should be expected that primary visit forms would not contain statin prescription, because patients were prescribed diet on this stage, except for high risk patients with extremely high serum cholesterol levels and comorbidities such as diabetes mellitus. During secondary visits the patients have to be tested for cholesterol and in the case if serum cholesterol levels remain high the cardiologist could prescribe statins. Therefore, it is expected that notes on statin prescription would be found in secondary visit forms. But as

statins are prescribed only after the test results from the secondary visits are available, it is possible that physicians do prescribe statin but that information is not reported on the form.

Prescription of cholesterol/lipid profile tests was not very informative (36.9%), because generally physicians recorded prescription of the test after getting an agreement from patients that it will be completed. The low proportion of IHD patients who undergo laboratory tests could be explained by patients' reluctance or inability to pay additional (lab tests prices are not included in consultation price) money for laboratory tests.

The difference between proportions of patients with lab test results for serum cholesterol and the whole lipid profile (correspondingly 28.1%/ 23.1%) could be explained by specific prescription of physician or by the difference in the prices of the tests (600 AMD for cholesterol test and 3500 AMD for lipid profile tests). The present study design did not allow clarifying which of the reasons prevail for not performing the tests or performing them partly. More often the test prescription became evident from the presence of test result sheet only.

The SEF forms were not completely recorded. The study design did not allow checking the validity of records (9); except for "hypercholesterolemia", where we could see discordance between notes and lab test results. The PPV, NPV, and percent agreement were very low for physician notes and lab test results. According to ACC cardiologists' explanations, they note down the answer for this item based on the patient reply, which is not objective. Besides, cardiologists mentioned that they often recorded "no" when patient tells that he/she didn't perform lab test or didn't remember test result. This approach needs revision.

Recommendations

The main recommendation is improvement of recording data in SEFs in ACC. The present study revealed that deficiencies in recording were numerous and they reduced the validity of study, limited the completeness of information kept in ACC and the value of any study that could be held in ACC. To improve recording, it may be necessary to revise the forms and improve physician and staff training on their use and importance. Additional choice of answer, namely "not performed" could be included for "hypercholesterolemia" item in primary visit form. " Use of cholesterol and saturated fat " could be excluded from the first visit form because these items were not recorded.

Revision of randomly selected SEFs could be organized by ACC staff periodically. The findings could be presented on staff meetings; the possible measures discussed and implemented, and further improvements seen during next revisions. It's important to increase the awareness of ACC staff on the importance of information kept in the clinic.

In order to increase the compliance and desire to complete prescribed laboratory tests by patients, ACC physicians should emphasize to their clients the importance of laboratory tests for the patient management. It is essential that for the patients with limited resources cardiologists emphasize the necessity of performing at least the minimum number of required tests.

There is a need for revision of statin practice in ACC and creating guidelines for statin use.

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