A Rational Approach in Uveitis Diagnosis

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Abstract

Introduction

As the differential diagnosis of uveitis is broad, a battery of tests is often applied in attempting to identify it. Recently, Jabs and Busingye have reported on their approach to uveitis diagnosis, which requires meticulous characterization of the patient's history and pertinent clinical findings. In this study we aim to evaluate the cost-effectiveness of this approach in our small scale medical center.

Methods

Uveitis patients who were hospitalized in our department in 2013 were identified with a computerized query. All laboratory and radiographic testing charts were reviewed. The cost of each ancillary test was determined based on the Israeli Ministry of Health's price list for ambulatory and hospitalization services. Using Jabs and Busingye system, we identified the appropriate tests to be run in each case.

Results

We included six uveitis cases in this study (5 females, mean age: 55.3±15.8). An average of 24 tests was conducted on each patient, with an average cost per patient of $940.7 (95% CI, $794.7-$1087.4). Comparing to the classification system, an average of eight tests should have been conducted, with an average cost of $203.7 per patient, a saving of 78.3%, p<.001. The theoretical rational approach did not change any patient's diagnosis of underlying causes nor did it affect the final outcome.

Conclusions

The non-selective prescription of uveitis tests is clearly more expensive than a rational, selective approach to determining a diagnosis. In a small medical center like ours, classifying patients according to clinical and historical findings and then using an algorithmic approach to identifying the most appropriate testing methods could minimize costs significantly.

Keywords: Differential Diagnosis; Uveitis; Classifying; Costs

Introduction

As the differential diagnosis of uveitis is broad, a battery of tests is often applied in attempting to identify it. The use of established guidelines in order to select the most appropriate specific ancillary tests could reduce costs significantly, as was demonstrated by Noble et al for the diagnosis of anterior uveitis in Canada [1].

Recently, Jabs and Busingye have reported on their approach to uveitis diagnosis, which requires meticulous characterization of the patient's history and pertinent clinical findings [2]. Jabs and Busingye offers a classification system that aids in navigating amongst thirty types of uveitis by getting a thorough history, specifically describing the clinical findings and a judicious imaging and laboratory use. Their system is derived from work done by the Standardization of Uveitis Nomenclature Project, which includes 79 scientists from 18 countries that develop classification criteria for uveitis [3].

Diagnosis is begun characterizing the disease along several dimensions:

Disease course: acute monophasic, acute recurrent or chronic. Acute course has sudden-onset and limited duration (up to 3 months) and can be subdivided to acute monophonic (single episode) or to acute recurrent (several inflammation events separated by quiet periods when not on therapy). Chronic course has an insidious onset, last longer than 3 months and relapses when therapy is discontinued.

Laterality: unilateral, unilateral alternating, bilateral simultaneous, or bilateral asynchronous.

In unilateral disease the same eye is affected; in unilateral alternating either eye may be affected at a time but not both; in bilateral...
simultaneous both eyes are involved; in bilateral asynchronous the onset of both eyes is not simultaneous but both eyes remain affected after the second eye.

Anatomic location: anterior, intermediate, posterior or panuveitis

This dimension is based on the primary location of the inflammatory reaction. Finding in anterior disease includes cells in the anterior chamber, cells behind the lens (iriticicylitis), posterior or peripheral anterior synchia and no reaction in the vitreous. In intermediate disease the vitreous is mainly inflamed. Mild reaction could be seen in the anterior chamber. If a substantial anterior chamber reaction exists then the uveitis is classified as both an anterior and intermediate uveitis: Posterior disease is subdivided, according to the main inflammation site, to retinitis, choroiditis or retinal vasculitis (vascular occlusion). In Panuveitis the reaction may affects the anterior chamber, vitreous, or the chorio-retina but no one location predominates.

Morphology of the posterior disease lesions:

quantity (Paucifocal or multifocal) and appearance (amoeboid, serpentine, placoid, ovoid or punctuate).

Retinitis and choroiditis can be further subdivided according to the amount of lesion (few or many). Choroiditis can be classified according to the lesions shape and color.

Characterization the uveitis along these dimensions can lead to a reduced differential diagnosis. For example, a patient with anterior uveitis has 20% chance to be HLA-B27-associated. However, a patient with acute recurrent course, with alternating anterior uveitis has 20% chance to be HLA-B27-associated. Mild reaction could be seen in the anterior chamber. If a substantial anterior chamber reaction exists then the uveitis is classified as both an anterior and intermediate uveitis: Posterior disease is subdivided, according to the main inflammation site, to retinitis, choroiditis or retinal vasculitis (vascular occlusion). In Panuveitis the reaction may affects the anterior chamber, vitreous, or the chorio-retina but no one location predominates.

Moreover, improved characterization of clinical finding can lead to reduce exams cost, for example in anterior uveitis: stellers keratic precipitates and heterochromia may be seen in Fuchs heterochromic iridocyclitis, hypopyon may be demonstrated in Behçet uveitis or in HLA-B27 associated uveitis and the iris will be atrophied in 95% patients with a positive PCR for viral herpetic uveitis [4].

Following several Jabs and Busingye screening recommendations (Table 1) we aim, in this report, to evaluate the cost-effectiveness of this approach in our small scale medical center.

Uveitis patients who were hospitalized in our department in 2013 were identified with a computerized query. All laboratory and radiographic testing charts were reviewed. The cost of each ancillary test was determined based on the Israeli Ministry of Health's price list for ambulatory and hospitalization services [6]. Prices were converted to US dollars (USD) from New Israel Shekels (NIS) based on the conversion rate of ILS/USD = 3.50.

Using Jabs and Busingye system, we identified the appropriate tests to be run in each case. We then assessed the cost effectiveness of using their classification system by comparing those results with the actual costs of previous testing.

We included six cases in this study (5 females, mean age: 55.3±15.8). Two patients had chronic unilateral course (one with anterior uveitis and one with panuveitis). Three patients had acute monophasic course (two with unilateral anterior uveitis and one with bilateral simultaneous anterior uveitis). One patient had acute recurrent unilateral anterior uveitis. All were adult immunocompetent patients. An average of 24 tests was conducted on each patient, with an average cost per patient of $940.7 (95% CI, $794.7-$1087.4).

Table 1: Screening recommendations

<table>
<thead>
<tr>
<th>Screen for:</th>
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<tr>
<td>Syphilis</td>
<td>Can present as any type of uveitis (although accounts for only 1% of cases)</td>
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<tr>
<td>HLA-B27</td>
<td>In recurrent acute unilateral disease.</td>
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<tr>
<td>Antinuclear antibody (ANA)</td>
<td>In a patient with juvenile idiopathic arthritis. Screening all uveitis patients for ANA will yield a 0.6% positive predictive value (wrong in 99% of cases).</td>
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<tr>
<td>Tuberculosis (TB)</td>
<td>Screening depends on TB prevalence in the population and previous exposure. Screen in patients with Eales disease, choroidal tuberculoma, serpiginous-like tuberculosis choroiditis, or immunosuppressed state</td>
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<tr>
<td>Do not Screen for:</td>
<td></td>
</tr>
<tr>
<td>HLA-A29</td>
<td>For birdshot chorioretinitis. Screening all patients with posterior uveitis are will yield a 47% positive predictive value.</td>
</tr>
<tr>
<td>HLA-B51</td>
<td>For Behçet uveitis. Poor positive predictive value.</td>
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<tr>
<td>Toxoplasma gondii</td>
<td>25% of the general population will have antibodies indicating previous exposure, but not disease.</td>
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<tr>
<td>Herpes simplex</td>
<td>70% previous exposure.</td>
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No change in the diagnosis occurred after using the classification system. Moreover, comparing to the classification system, an average of eight tests should have been conducted, with an average cost of $203.7 per patient, a saving of 78.3%, p<.001. These results are comparable to those generated by the Canadian National Uveitis Survey. The Canadian national cross-sectional survey indicates that the non-selective prescription of uveitis tests is clearly more expensive than a rational, selective approach to determining a diagnosis a potential cost reduction of 21.8% — 75.2% might be accomplished by adhering to a rational guideline for diagnosis [7]. In a small medical center like ours, classifying patients according to clinical and historical findings and then using an algorithmic approach to identifying the most appropriate testing methods could minimize costs significantly [8]. By adhering to the guideline as opposed to a “gunshot approach” we naturally were able to reduce cost. In 2013, we could have saved $4,422.1 for our institution. Costs should be considered when prescribing tests, even though it might mean that a diagnosis goes undetected. In our small sample, the theoretical rational approach did not change any patient’s diagnosis of underlying causes nor did it affect the final outcome.

References