Evaluation of Pain Medications in Patients with Liver Disease

Jeremiah Vance Pharm.D. Candidate
Carrie Vogler Pharm.D., BCPS

Southern Illinois University Edwardsville School of Pharmacy

BACKGROUND

- Pain is reported in 82% of patients with liver disease and cirrhosis[1]
- No guidelines or protocols exist for the treatment of pain in patients with liver disease
- Cirrhosis is responsible for approximately 770,000 deaths annually[2]
- Acetaminophen dosing is 2-3 grams in 24 hours for patients with liver disease (2 grams in cirrhosis)[3]
- Opioids undergo extensive dosage adjustments in liver disease

OBJECTIVES

- To observe pain locations, pain scores, liver disease severity (Child Pugh or MELD Score), and pain medications/doses that are being used in patients with liver disease

METHODS

Study Design:

- Single Center, Retrospective Chart Review
- 500 bed teaching hospital in Springfield, Illinois

IRB Approval:

- The Springfield Committee for Research Involving Human Subjects (SCRIHS)

Inclusion Criteria:

- Patients aged 18 to 89 years of age
- ICD 10 codes K70 Alcoholic Liver Disease and K74 Fibrosis and cirrhosis of liver
- Must have received at least one dose of analgesic medication within 72 hours of admission

Exclusion Criteria:

- Patients end of life or hospice
- Hospital stay < 24 hours
- Patients who presented with drug-induced overdose

Data Analysis:

- Descriptive statistics:
  - Average, mean, median, mode of data, and range with standard deviation

Results

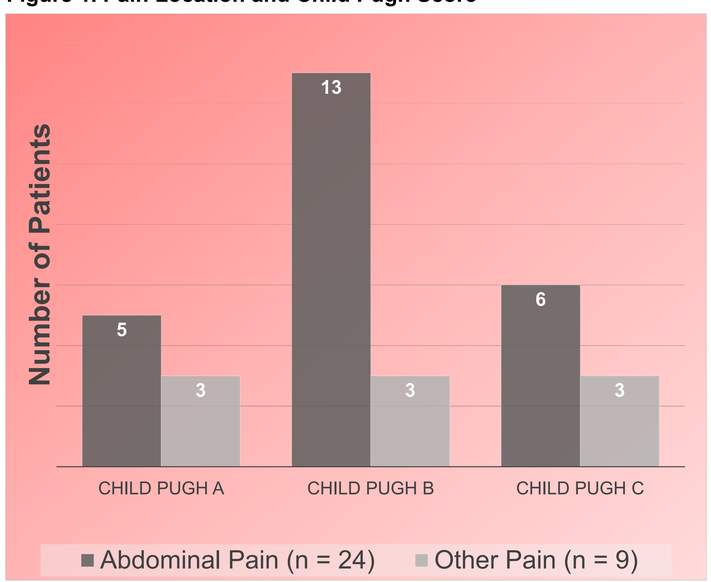
Table 1. Baseline Characteristics

Variable	Mean ± SD, n (%)
Age, years	52 ± 13.2
Height, in	68 ± 3.8
Weight, kg	98.9 ± 28.7
MELD Score	23 ± 6.7
Sex, male	20 (60.6)
Reported race	
White	29 (87.8)
African American	4 (12.2)
Child Pugh Score	
A	8 (24)
B	16 (49)
C	9 (27)

Table 2: Medication administrations over 72 hours (n = 33)

Medication	Administrations n = 232
Morphine IV	79 doses
Hydrocodone/acetaminophen PO	61 doses
Acetaminophen PO	24 doses
Hydromorphone IV	19 doses
Tramadol PO	16 doses
Morphine PO	10 doses
Oxycodone PO	10 doses
Fentanyl IV	5 doses
Aspirin PO	3 doses
Ketorolac IV	3 doses
Ibuprofen PO	1 dose
Tramadol/acetaminophen PO	1 dose

Figure 1. Pain Location and Child Pugh Score



Results

Table 3. First Pain Medication by Child Pugh Score and Pain Score

Medication and Route*	Child Pugh Score (A, B, C)	(n = Number of Patients)	Pain Score Pre-administration avg±SD (Range)#	Pain Score Post-administration avg±SD (Range)
Morphine IV	A B C	6 6 4	8.6 ± 1.12 (4-10)	5.8 ± 3.14 (0-10)
Fentanyl IV	A B C	0 3 2	8.8 ± 1.26 (9-10)	6.2 ± 3.03 (2-10)
Hydrocodone/ acetaminophen PO**	A B C	0 4 0	7.5 ± (6-10)	6
Acetaminophen PO	A B C	1 2 1	6.75 ± 2.47 (4-10)	7 ± 2.16 (5-10)

Pain Scores are average of all Child Pugh score per medication
Abbreviations: Intravenous (IV) By Mouth (PO)
* Medication irrespective of dose
** Post administration pain score was not reported in 3/4 patients

Table 4: Pain Medication Doses and Child Pugh Score

Medication	Total Number of Doses	Number of Patients Receiving Doses (n = 36)
Morphine IV	79	18
Child Pugh A	27	4
Child Pugh B	46	9
Child Pugh C	6	5
Hydrocodone/acetaminophen PO	61	12
Child Pugh A	13	2
Child Pugh B	39	8
Child Pugh C	9	2
Hydromorphone IV	19	6
Child Pugh A	16	4
Child Pugh B	3	2
Child Pugh C	0	0

*n = 36 does not reflect study sample size. Patients could have received more than 1 medication

Discussion

- There was a large variability in the pain medications including initial drug selected and dosages (Table 2 and 3). Individual dosages were not assessed
- The most common medications used were hydrocodone/acetaminophen and IV morphine. Literature recommends the use of hydromorphone and fentanyl for acute pain due to limited dose reductions and less accumulation in renal dysfunction
- In this study, there was no identifiable trend of prescribing certain pain medications in relation to pain location, pain score, or Child Pugh score.

Limitations

- Site was a single center location
- Retrospective study design
- Study had a small sample size
- Self conducted chart review was done to gather data

CONCLUSION

- Patient specific factors such as Child Pugh score and pain scores, used in conjunction with drug pharmacokinetics, is an area to expand research. This could lead to the design of treatment protocols for this patient population through collaboration of physicians treating pain in patients with liver disease and pharmacists providing knowledge in drug pharmacodynamics and pharmacokinetics.

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