

Coinfection of *Schistosoma* species with Hepatitis B or Hepatitis C Viruses

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Tables 1.3.2 Studies Conducted on Subjects with Primary Liver Cancer.

| No. | Reference | Location (Years) | Study Design (Objective) and Study Population | Diagnosis of Disease | Prevalence | Findings on Coinfection |
|-----|---------------------|---|--|--|--|--|
| 1 | Zhou et al. 2010 | Eastern Hepatobiliary Surgery Hospital, China (2003-2006) | <i>Case Control</i> (risk factors, interaction): <u>Cases</u> : 317 ICC patients, aged 21-73 years, 70% male; <u>Controls</u> : 634 healthy subjects without hepatopathology, matched for sex and age | <u>HBV</u> : HBsAg; <u>HCV</u> : anti-HCV; <u>LSch(Sj)</u> : liver biopsy; <u>ICC</u> : histologically confirmed prior diagnosis | <u>Cases (n=317)</u> : 49% HBsAg+, LT 1% anti-HCV+, 5% LSch, <i>Coinfected</i> : 2% HBsAg+ w/LSch; <i>Anti-HCV+ w/LSch n.a.</i> ; <u>Controls (n=634)</u> : 7% HBsAg, 0% anti-HCV+, 1% LSch+, <i>Coinfected</i> : n.a. | HBsAg+ and LSch+ independently associated with ICC in multivariate model: HBsAg+ RR 9.7, 95% CI 6.3, 14.8, LSch+ RR 11.1, 95% CI 3.4, 36.3, no interaction noted; LSch+ was present in nearly equal proportions of ICC patients that were HBsAg+ (5%) and HBsAg- (6%). |
| 2 | Mabrouk et al. 1997 | Ain Shams University Hospital, Cairo, Egypt (1995-1996) | <i>Case Series</i> (prevalence): <u>Cases</u> : 34 HCC patients, aged 48-61 years, 77% male; <u>Controls</u> : 27 non-HCC subjects, n.o.s. used in some analyses; <u>Note</u> : Patients had underlying cirrhosis, but no reported history of alcohol abuse, hormone use or toxin exposure. | <u>HBV</u> : HBsAg; <u>HCV</u> : anti-HCV, HCV RNA; <u>Sch</u> : SchAb; <u>HCC</u> : liver biopsy/CT scan, AFP. <u>Note</u> : SchAb status determined only in anti-HCV+ w/HBsAg- subjects. | <u>Patients (n=34)</u> : 21% HBsAg+, 94% anti-HCV+, 35% HCV-RNA+, SchAb+: n.a., <i>Coinfected n.a.</i> ; <u>Controls</u> : n.a.; <u>Note</u> : 16% patients coinfecting with HBsAg+ w/anti-HCV+. | Among HBsAb- subjects, SchAb+ occurred more often in anti-HCV+ HCC patients than in anti-HCV+ controls (92% vs. 61%); Anti-HCV+ and SchAb+ appear to be associated in HCC cases; HCC may develop through a cascade of Sch followed by HCV infection > cirrhosis > HCC. |
| 3 | Badawi et al. 1999 | National Cancer Institute, Cairo, Egypt (n.d.) | <i>Case Control</i> (risk factors, severity): <u>Cases</u> : 102 HCC patients from Nile Delta, mean age 53 years, 78% male; <u>Controls</u> : 96 subjects without | <u>HBV</u> : HBsAg, HBsAb, HBcAg; ; <u>Sch(Sm,Sh)</u> : stool, urine; <u>HCC</u> : histologically confirmed prior diagnosis, AFP | <u>Cases (n=102)</u> : 11% HBsAg+, 91% any HBV marker, 59% Sch+, <i>Coinfected</i> : 9% HBsAg+ w/Sch+; <u>Controls (n=96)</u> : 7% any HBV marker, 12% Sch+, <i>Coinfected</i> : n.a. | The frequency of HBsAg+ was higher among Sch+ patients than among those without the parasitic infection (15% vs. 5%); In general, Sch+ patients had a higher frequency of HBV markers than those with no |

Tables 1.3.2 Studies Conducted on Subjects with Primary Liver Cancer.

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| | | | hepatopathology, of comparable age and sex | | | signs of previous or current infection; The RR, adjusted for age and other factors, was highest for Sch+ (RR 5.2, 95% CI 2.9-9.3) and HBsAg+ (RR 12.5, 95% CI 6.1-25.6); Sch+ increased the severity of HBV infection and elevated the risk for HCC over that associated with HBV alone; No interaction in multivariate model reported; Coinfection w/Sch appears to prolong HBsAg carriage. |
| 4 | Hassan et al. 2001 | National Cancer Institute and University of Cairo, Cairo, Egypt (1995-1996) | <p><i>Case Control</i> (risk factors, interaction):</p> <p><u>Cases</u>: 33 HCC patients, mean age 55 years, 70% males; <u>Controls</u>: 25 HCC-free subjects comprised of non-relative visitors, 40% male, mean age 51 years</p> | <p><u>HBV</u>: HBsAg, HbcAB; <u>HCV</u>: anti-HCV; <u>Sch</u>: SchAb; <u>HCC</u>: histologically confirmed prior diagnosis</p> | <p><u>Cases</u> (n=33): 15% HBsAg+, 76% anti-HCV+, 21% SchAB+, <i>Coinfected: n.a.</i>; <u>Controls</u> (n=35): 3% HBsAg, 43% anti-HCV+, 14% SchAb+, <i>Coinfected: n.a.</i>; <u>Note</u>: some patients HBV+(n.s.) w/anti-HCV+: number not reported.</p> | <p>Among HBsAg- subjects, an interaction was noted between anti-HCV+ with SchAb+ (OR 10.2, 95% CI 1.3-79.8) that was much higher than for anti-HCV+ alone (OR 6.5, 95% CI 1.6-26.6) or SchAb+ alone (OR 0.2, 95%CI 0.1-6.2), adj for age, sex; No interactions noted between anti-HCV+ and HBV+ (n.s.), or between HBV+ (n.s.) and SchAb+ that affected HCC development; The presence of past or current Sch infection appears to increase the risk of HCC, but only in the presence of anti-HCV+; Alcohol use, oral contraceptive use, and</p> |

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| | | | | | | smoking all n.s. in multivariate model. |
| 5 | Inaba et al. 1984 | 7 hospitals in Yamanashi prefecture, Japan (1977-1979) | <p><i>Case Control</i> (risk factors, interaction): <u>Cases</u>: 62 liver cancer (HCC/hepatoma) patients from area endemic for SJ, 79% male, aged 45 to 74 years; <u>Controls</u>: 62 other hospital subjects, matched for age and sex; <u>Note</u>: 56 used in matched pair analysis)</p> | <p><u>HBV</u>: HBsAg , HBsAb; <u>Sch</u>: SchST(skin test); <u>HCC/hepatoma</u>: liver biopsy, AFP</p> | <p><u>Cases</u>: 36% HBsAg+(n=62), 57% SchST+(n=56), <u>Coinfected</u>: n.a.; <u>Controls (n=56)</u>: 3% HBsAg+, 18% HbsAb+, 58% SchST+, <u>Coinfected</u>: n.a.</p> | <p>Coinfected individuals (HBsAg+ w/SchST+) with a daily consumption of GE 1 cup of Japanese alcohol were at highest risk of disease; The adjusted RR based on the matched pair analysis was HbsAg+ (RR 10.0), SchST+ (RR 9.5), daily consumption of alcohol (RR 3.2); 95% CIs were not presented; trifecta of factors suggests possible interaction for liver cancer.</p> |
| 6 | Nouh et al. 1990 | King Abdul Aziz University Hospital, Riyadh, Saudi Arabia (1985-1987) | <p><i>Case Series</i> (prevalence): <u>Cases</u>: 50 HCC patients, aged 21-90 years, 86% males; No control group used.</p> | <p><u>HBV</u>: HBsAg; <u>Sch</u> (<u>prob. Sm</u>): SchAb; <u>HCC</u>: Liver biopsy/CT scan, AFP</p> | <p><u>Cases (n=50)</u>: 58% HBsAg+, 36% SchAb+, <u>Coinfected</u>: HBsAg+ w/SchAb+; <u>Note</u>: The prevalence of Sch in the general population was estimated to be up to 14% at this time.</p> | <p>The frequency of HBsAg+ was higher among SchAb+ HCC patients (66%) than among SchAb- HCC patients (53%); Of note: approximately twice the number of patients tested positive for the coinfection than reported a known history of both hepatitis/jaundice and Sch;</p> |

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| | | | | | | Coinfection appears to be related to the risk of HCC. |
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